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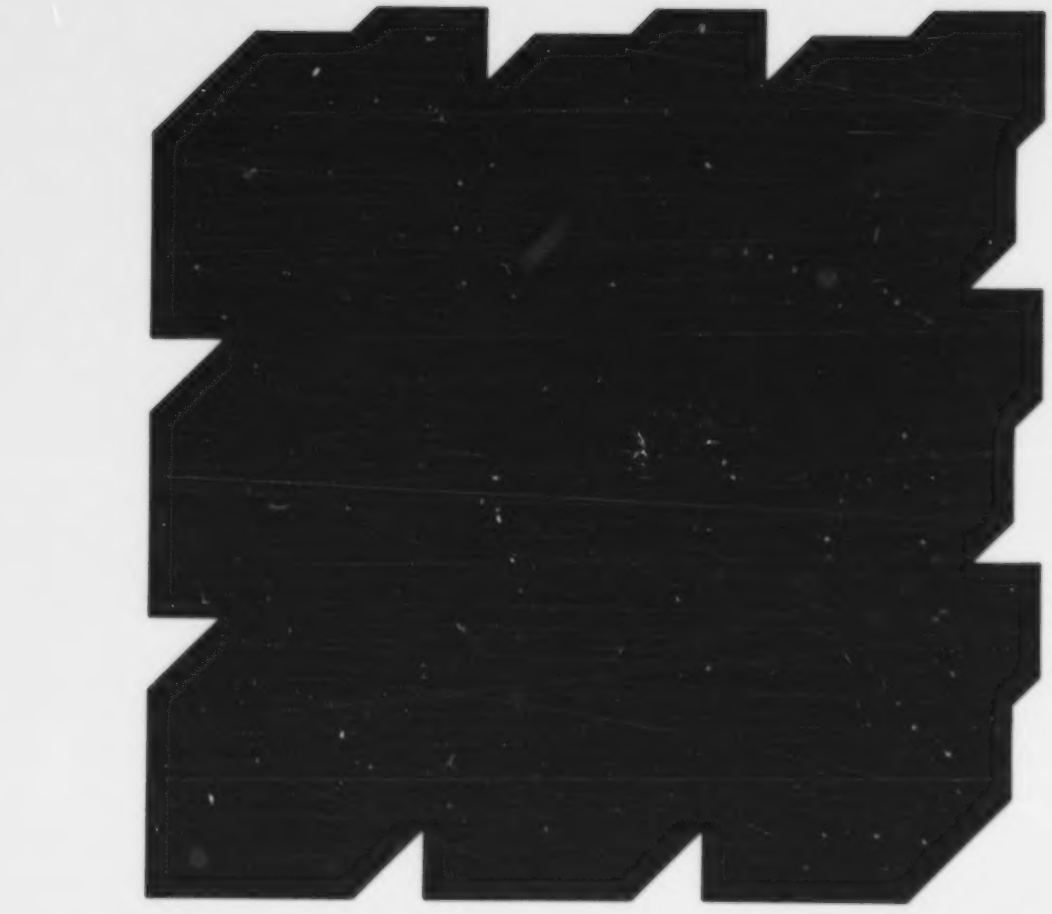

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DISCUSSION PAPER NO. 289

The Taxation of Capital Income in Canada: A Comparison with Sweden, the U.K., the U.S.A., and West Germany

by Michael Daly, Jack Jung, Pierre Mercier and Thomas Schweitzer

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RÉSUMÉ

On trouvera, dans le présent document, certaines estimations des taux d'impôt effectifs sur le revenu de capital au Canada, dans le cas de l'impôt sur le sociétés, de l'impôt foncier et de l'impôt sur le revenu des particuliers. Ces taux sont ensuite comparés à ceux qui ont cours dans quatre importants pays : les États-Unis, le Royaume-Uni, la Suède et l'Allemagne de l'Ouest.

Nous constatons qu'il existe des variations considérables au Canada dans les taux d'impôt marginaux effectifs selon : le genre d'immobilisations dans lesquelles les capitaux sont investis (machines, immeubles ou stocks); l'industrie choisie (secteur manufacturier, entreprises commerciales ou autres); le mode de financement (emprunts, nouvelles émissions d'actions ou bénéfices non répartis), et le statut fiscal de l'investisseur (ménage, institution exonérée d'impôt ou compagnie d'assurance). La variation des taux, ainsi que le taux global d'imposition, augmentent avec l'inflation.

En 1980, l'Allemagne était le pays où le taux global d'imposition était de loin le plus élevé (48,1 %), alors que le plus faible se trouvait au Royaume-Uni (3,7 %). Le taux global d'imposition au Canada (33,0 %) se rapprochait de ceux de la Suède (35,6 %) et des États-Unis (37,2 %).

Chose intéressante, parmi ces cinq pays, le Canada est celui où les taux d'impôt effectifs semblent varier le moins. Cependant, d'après nos calculs, la perte de bien-être découlant des taux d'impôt marginaux effectifs selon les types d'immobilisations et d'industries pourrait bien, à lui seul, représenter jusqu'à 2 % du produit national brut. L'ensemble des propositions présentées dans un document publié en même temps que le budget fédéral de 1985 réduirait sensiblement, si elles étaient appliquées, la variation des taux d'imposition, tout en ne modifiant à peu près pas le taux global d'impôt. En conséquence, la perte de bien-être attribuable à la variation des taux d'impôt effectifs diminuerait de plus de la moitié.

ABSTRACT

This paper presents some estimates concerning the effective tax rates levied on income from capital in Canada, taking into account corporate, property, and personal taxes. These tax rates are then compared with those of four major economies: the United States, the United Kingdom, Sweden and West Germany.

For Canada, we find enormous variation in effective marginal tax rates, depending on the type of capital in which investment takes place (machinery, buildings, or inventories), the industry in which the investment is made (manufacturing, commerce, or other industries), the method of finance (debt, new share issues, or retained earnings), and the tax status of the investor supplying the funds for the investment (households, tax-exempt institutions, or insurance companies). This variation, as well as the overall tax rate, increases with inflation.

In 1980, Germany had by far the highest overall tax rate (48.1 per cent) while the U.K. had the lowest (3.7 per cent). The overall tax rate for Canada (33.0 per cent) was close to those of Sweden (35.6 per cent) and the U.S. (37.2 per cent).

Interestingly enough, of all five countries, Canada appears to have the least variance in effective tax rates. Nevertheless, according to our calculations, the welfare cost associated with differences in effective marginal tax rates among types of capital and industries alone could be as much as 2 per cent of Gross National Product. The package of proposals contained in a paper released with the recent (1985) Federal Budget would, however, if implemented, markedly reduce the variation in tax rates while leaving the overall tax rate practically unchanged. As a result, the welfare cost arising from variation in effective tax rates would be cut by more than half.

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1 INTRODUCTION

The taxation of income from capital has an important potential influence on the allocation of investment and the efficiency of the economy. A recent study by M. King and D. Fullerton (1984), The Taxation of Income from Capital: A Comparative Study of the United States, the United Kingdom, Sweden and West Germany, [National Bureau of Economic Research, University of Chicago Press], subsequently referred to as K&F [1984], discusses extensively the taxation of capital in these four industrialized countries, and makes inter-country comparisons. The relevant taxation concept is the effective marginal tax rate: effective, because the tax rate actually paid usually differs from the statutory rate; marginal, because the effective rate on new investment usually differs from the average rate - the latter being the rate paid on all investment, new and old. K&F [1984] p. 302 suggest that a high variation of capital income taxation within a country has an unfavourable effect on economic growth, and that this unfavourable effect may be more important than that of the level of taxation.

The present paper is one in a series by the authors dealing with capital income taxation in Canada. A previous paper, A Comparison of Effective Marginal Tax Rates in Canadian Manufacturing

(subsequently referred to as D.J.M.S. 1985a) discusses the basic theory underlying the approach used in K&F [1984]. In the present paper we shall not repeat the discussion of the model and refer the interested reader to K&F [1984], pp. 7-30, and D.J.M.S. [1985] Appendix A. We shall restrict ourselves here to aspects of our work which are of special additional interest to readers who wish to compare our results with those of K&F [1984].

Two important concepts in K&F [1984] are the pre-tax real rate of return on a marginal investment project net of depreciation (p) and the post-tax real rate of return to the saver who supplied the finance for the investment (s). The difference between the two rates is called the tax wedge (w) and the tax rate t is defined as (p-s)/p.

Under a given tax system, the size of the tax wedge (and the tax rate) of a particular investment project can depend on many things. It can depend on the industry in which the investment project is undertaken. For instance, in many countries manufacturing is taxed more lightly than other industries. It can also depend on the type of asset in which the investment is made. Thus, investment in machinery is often taxed at a lower rate than buildings. Further, the tax wedge (and tax rate) can depend on the method of financing. In all four countries discussed in K&F [1984], investment projects financed by debt are taxed less than those financed by equity. In addition, it may depend on the saver: for example, households are subject to personal income tax

on capital income, while tax-exempt institutions such as pension funds are (by definition) not subject to tax.

K&F [1984] compute the tax wedge and tax rate of a number of hypothetical investment projects, each with a particular combination of characteristics that influence the capital income tax levied on the project. The characteristics are:

A) the industry in which the project is undertaken. They chose three major industry aggregates, namely

1) manufacturing
2) other industry
3) commerce.

Manufacturing is self-explanatory; "other industry" consists of construction, storage, transportation, communications, and utilities; commerce consists of non-financial services and distribution. In our attempt to duplicate the K&F study for Canada we defined manufacturing as the Standard Industrial Classification (SIC) industries #101-399, other industry as SIC #404-573, and commerce as SIC #602-699, 801-809.

B) the asset in which the funds are invested. K&F chose three asset types,

1) machinery
2) buildings
3) inventories.

C) the source of finance,

1) debt

2) new share issues

3) retained earnings.

Following K&F, we assume that investment financed by debt yields capital income in the form of interest, that financed by new share issues yields dividends and that financed by retained earnings yields capital gains. Each of these income types is treated differently by the tax laws.

D) ownership categories,

1) households

2) tax exempt institutions

3) insurance companies.

Thus K&F [1984] investigated 81 hypothetical projects - 3 industries x 3 assets x 3 sources of finance x 3 ownership categories. Tax rates for each characteristic can be calculated by appropriately weighting the tax rates of the pertinent hypothetical projects. For instance, the tax rate for manufacturing can be obtained by calculating the weighted average of 27 projects (3 assets x 3 sources of finance x 3 ownership categories) in manufacturing. Similarly the tax rate on retained earnings can be obtained by calculating a weighted average of 27 tax rates (3 industries x 3 assets x 3 ownership categories).

Tax wedges and rates can be calculated in a variety of ways. One possible method is to examine the case where all investment projects yield a certain pre-tax rate of return (the "hurdle rate"). K&F call this the "fixed-p" case, using a real pre-tax return of 10 per cent.

Needless to say, one would expect capital investment to be encouraged in low-taxed projects relative to more highly taxed ones. Unfortunately, there is very little agreement among economists as to what constitutes an appropriate capital market equilibrium. One possibility would be to assume that capital would be allocated in such a way as to attain an equilibrium where each project earned the same rate of return after corporate, property, and personal taxes. However, a sizable proportion of capital income is now derived from tax-exempt pension funds and RRSPs. Complete tax arbitrage would eliminate any differences in personal tax rates on capital income, so that the only possible equilibrium would be one in which the effective personal tax rate on capital income would be zero. Such an assumption is not plausible given that the opportunities for arbitrage in the capital market are circumscribed due to restrictions imposed by the government on the flow of savings from households to tax-exempt institutions. Hence, instead of considering a situation in which all savers receive the same rate of return after personal and corporate taxes (fixed-s), King and Fullerton consider a scenario where arbitrage leads to an outcome in which all savers

receive the same real return after corporate tax on each project as on a bond having a prespecified real interest rate of 5 per cent per annum. This is what they refer to as their fixed-r case.

In our calculations, we shall follow, as far as Canadian data availability permits, the K&F [1984] methodology, so as to permit the comparability of our results with theirs. Furthermore, we shall assume, unless otherwise indicated, that all corporations make sufficient profits to take advantage of all the deductions and allowances permitted by the tax code. We also wish to emphasize that in the present paper we regard the total (corporation plus property plus personal) tax wedge and rate as the relevant concept.

Chapter 2 of this study contains a short description of the Canadian capital taxation system. Chapter 3 reports and discusses the results of our calculations for tax rates of investments in the industry, asset, finance, and ownership categories mentioned above. It presents the effective marginal tax rates in 1980 for Canada, discusses the effect of the tax changes in later years as well as proposals contained in a Discussion Paper accompanying the 1985 Federal Budget, and includes a rough estimate of the welfare loss caused by the dispersion of effective rates. Chapter 4 compares the 1980 Canadian rates with the corresponding rates in the four countries discussed in K&F [1984], and deals with the

effect of inflation on the rates. It also discusses the causes of the differences between the Canadian rates and those of the other countries. Chapter 5 summarizes our most important findings.

Appendix A tabulates the parameters used in our calculations.

Appendix B lists the marginal effective tax rates of the 81 types of investment projects studied for zero, ten per cent and actual inflation in the period 1970-80 for the fixed-p case.

Appendix C describes the structure, source of finance, and ownership of the capital stock of Canada in 1980.

Appendix D contains details of the welfare loss calculations made in the paper.

2 THE TAXATION OF CAPITAL INCOME IN CANADA

Since the Second World War, Canada's income tax system has undergone a large number of changes, many of them affecting the taxation of income from capital. A variety of tax concessions have been embodied in the tax system, particularly at the corporate level, to encourage investment, with the manufacturing sector receiving especially favourable treatment. Such concessions help to explain the marked decline in the contribution of the corporate tax to total tax receipts. Whereas in 1951 the corporate tax yielded almost one-quarter of total Canadian tax revenue, by 1982 its share had dropped to only 6.5 per cent. By contrast, despite the institution of tax measures to encourage personal saving, the personal income tax has grown to such an extent that it is now the main source of revenue for federal and provincial governments combined, accounting for over 30 per cent of total tax receipts in 1982.

The Corporate Tax System

Although the basic statutory federal corporate tax rate is 46 per cent, this rate is reduced by 10 percentage points to allow room for provinces to levy their own corporate taxes at different rates. Reductions in both federal and provincial corporate tax

rates are then permitted for firms engaged in manufacturing and processing as well as for small businesses. Not surprisingly, as shown in Table 2-1, the resulting statutory corporate tax rate (τ) varies considerably among industries.

Effective corporate tax rates on new investment projects are, however, well below these statutory rates for a number of reasons. First, accelerated depreciation allowances enable firms to write-off their investments for tax purposes long before the end of their useful lives. Manufacturing and processing machinery (CCA class 29), for example, could in 1980 be written off in only two years. Second, investment tax credits (ITCs) are available for new investments of specific types at rates that vary by region. Third, returns to capital in the form of interest payments on corporate debt are treated as a business expense and, therefore, are tax-deductible, whereas dividends on equity capital are not similarly deductible.

The foregoing tax credits and deductions together with further differences for the tax treatment of inventories lead to wide variation in effective corporate tax rates among different types of capital and sources of finance. The discrepancies arise from the fact that effective ITC rates ($\bar{g}$) differ by asset and by industry (see Tables 2-2 and 2-3). Moreover, accelerated capital cost allowances result in machinery being taxed much less than

either buildings (whose tax lives correspond more closely with economic lives), or inventories. Investments in buildings are further penalized because they tend to bear a disproportionate burden of property taxes (W_c) which again varies between industries (see next section). As regards inventories, First-In First-Out (FIFO) accounting methods mean that when an item is taken out of a firm's inventory the deduction allowed is equal only to the cost of acquiring the oldest item held in the inventory. Hence, during inflationary periods, the deduction for use of inventory falls short of its replacement cost so that taxable income is overstated. Consequently, the effective corporate tax rate associated with investment in inventories rises with inflation. In order to compensate for this, firms have been permitted a 3 per cent inventory allowance since 1977. To the extent that the rate of inflation exceeds 3 per cent, however, corporate taxes on inventories increase. Inflation also tends to reduce the value of capital cost allowances. The latter too are based on historical rather than current replacement cost.

The tax deduction accorded to corporations on their interest payments (and the non-deductibility of dividend payments) means that investments financed by debt are taxed much less at the corporate level than those financed by new share issues or retained earnings. This difference increases with inflation because nominal interest rates rise in order to compensate lenders

for the decline in the purchasing power of the funds loaned. In effect, when inflation occurs borrowers are permitted by the tax system to deduct part of the loan principal outstanding as well as real interest expenses.

As a result of these tax deductions and credits accorded to corporations, firms and industries with different capital and financial structures can be expected to face very different effective marginal corporate tax rates. Generalizing, firms and industries investing relatively heavily in machinery and using debt finance receive more favourable tax treatment than those investing in buildings or inventories and using equity finance. We would also expect effective tax rates to vary with inflation.

Property Tax Rates

Little information is available on the property taxes Canadian corporations pay. In order to get an approximate idea of corporation property tax rates, we pursued the following approach.

Using information on the value of land, obtained from the SOCRAT data base of G.P. Jenkins and of building and engineering construction from Statistics Canada, Fixed Investment Stocks and Flows (Catalogue No. 13-211) we obtained a proxy for the property tax base by aggregate industries. The non-commodity indirect tax column of Statistics Canada's Input/Output Tables contains, among

other taxes, the property tax. We subtracted the property tax paid on owner-occupied housing from these tables and estimated that 58 per cent of the remaining non-commodity indirect tax constituted property tax paid by business. The tax base, by industry, was then adjusted to exclude Crown corporations because the latter pay very little, if any, property tax. The resulting tax payment, applied to the adjusted tax base, yielded the implied average property tax rate by aggregate industries. No information is available on marginal effective property taxes; therefore we use the implied average rates in what follows. Similar simplifying assumptions were used by K&F [1984] (e.g., pp. 217-220). The tax rates we use are tabulated in Table 2-1.

The Personal Tax System

Saving and investment decisions can also be affected by the treatment of capital income in the personal tax system. In our model, investments can be financed by savings from three categories of owner: (1) households, (2) tax-exempt institutions, and (3) insurance companies. The first category includes saving through taxed intermediaries such as banks or mutual funds. The second category includes savings held indirectly by households in the form of pension funds and registered retirement savings plans together with the pension business of life insurance companies. The third category involves mostly funds invested as part of contractual savings made by households through life insurance

policies. As we shall see below, the tax treatment of income from each category of savings is quite different.

(1) Households

While nominal interest paid on corporate debt is tax-deductible, it is taxable when received as income by households at a rate m_d. Shareholders presently face on their dividend income and capital gain a personal tax rate of m_e which is higher than m_d owing to the fact that dividends are concentrated more heavily among persons in high income brackets than is interest income. In order to provide relief from double taxation, however, part of the corporation's tax bill is, in effect, imputed to shareholders. Each dollar of dividends received by Canadian taxpayers from taxable Canadian corporations is regarded as having paid personal tax at the rate c and is therefore equivalent to a gross dividend of $1/(1-c). In other words, the dividend is "grossed up" at the rate c, the imputation rate, which is approximately one-third. As this gross dividend is deemed to have paid tax at the rate c, shareholders are entitled to a credit against their personal tax liability of c/(1-c) per unit of dividends received.[1] The dividend tax credit is reflected in the parameter θ, the opportunity cost of retained earnings in terms of gross dividends foregone, which can be defined as $\theta = 1/(1-c)$. Finally, capital gains are taxed at the effective accrued tax (EAT) rate denoted by z, which in our model is endogenously determined using the average personal marginal tax rate on capital gains on Canadian securities (z_s).

The personal tax parameters m_d, m_e and z_s were obtained from the Department of Finance's tax simulation model using 1981 data on a sample of taxfilers and the 1984 tax structure. In order to calculate the average personal marginal tax rate on a particular type of income, the simulation model raises all taxfilers' receipts of that income by 1 per cent, recalculates their tax liabilities, sums the additional taxes that would be paid and then divides by the total increase in all filers' income. The average personal marginal tax rate is therefore a weighted average where the weights are the taxfilers' shares of the type of income under consideration.

The Department of Finance's simulation model shows that if a marginal dollar of interest income were distributed proportionately among taxfilers according to their share of total interest income, the additional taxes paid would be 32 cents. However, a part of tax filers' bank deposits were in chequing deposits. In 1980 such deposits did not earn interest but provided depositors with free banking services which were not taxed. It is necessary to adjust the tax rate on interest income for this factor (see also K&F, 1984, pp. 223-226). The adjustment reduces the tax on interest income (m_d) to 29 cents.

In the case of an additional dollar of dividend income, not taking into account the dividend tax credit, 42 cents would be paid in taxes. Remark, however, that the dividend tax credit effectively reduces the amount of taxes paid on dividend income to 13 cents.

Following the same procedure, the tax rate on an additional dollar of capital gains was estimated to be 21 per cent. The conversion of this rate into an effective accrued tax rate (EAT rate) is described in D.J.M.S. [1985a] Appendix A which calculates endogenously the ratio of the EAT rate (z) to the statutory rate (z_s).

(2) Tax-exempt institutions

By definition, tax-exempt institutions administering pension funds and registered retirement savings plans (RRSPs) pay no tax on interest income, dividends or capital gains. Implicit in our model is the assumption that the income tax rate against which contributions to pension schemes and RRSPs are deducted is the same as the tax rate at which retirement benefits are taxed when paid out. In practice, however, most individuals are likely to face higher tax rates while making contributions to pension schemes and RRSPs during their working life than when they receive retirement income. Insofar as tax rates fall after retirement, the effective tax rate on capital income from pension and RRSP funds is therefore negative rather than zero. Consequently, our calculations may tend to overstate the actual marginal tax rate on capital income for this particular category of ownership.[2]

(3) The taxation of life insurance

As regards the tax treatment of income from savings through life insurance policies, the taxation of both the life insurance company and the policyholder needs to be taken into account. Life insurance policyholders are not taxed on income earned through "exempt" life insurance policies unless and until the policy is surrendered or matures as an endowment.[3] In such a situation personal taxes are postponed for perhaps 10 to 20 years and even then probably paid at low post-retirement rates so that the discounted value of tax payments is sufficiently small to be ignored.[4] Hence our calculations assume a zero personal tax rate on capital income earned by the life insurance policy holder.

Life insurance companies are allowed policy reserve deductions which ensure that any interest income earned on policyholders' funds is not taxable if it is used to fund future payments to policyholders. Our model assumes that on the margin no profits are earned by life insurance companies so that all income earned on policyholders' funds is required to fund these future payments. It follows that if a life insurance company invests in corporate debt, its tax rate is zero. If, instead, the insurance company invests in shares, the policy reserve deduction is still permitted even though investment income may be taxed at a very low rate or not at all. This is due to the fact that in order to avoid double taxation, intercorporate dividends are tax deductible upon

receipt. By contrast, capital gains are taxed at half the insurance company's statutory tax rate, τ_I. The latter was estimated to be 49.09 per cent.[5] The net effect, therefore, of using policyholders' funds to invest in equity can be to reduce the corporate tax paid by the life insurance company on its income from other activities. The latter together with the assumed zero personal tax rate applying to the policy holder means that income from equity held by life insurance companies is subsidized under the existing tax system.

Table 2-1

Statutory Corporate and Property Tax Rates for Canadian Industries, 1980

Industry	Statutory Corporate Tax Rate (τ)			Property Tax Rate (W_c)
	Total	Federal	Provincial	
		%		
Manufacturing	41.40	30.34	10.76	1.85
Trade and Commerce	31.59	24.08	7.51	1.13
Other	38.05	28.77	9.28	2.82

Source: Statistics Canada, Corporation Taxation Statistics (1981), Catalogue No. 61-208, for corporate tax rates. For property taxes see text.

Table 2-2

Distribution of Additions of Assets Among Main CCA Classes, 1980

Industry	Machinery CCA Class									Buildings CCA Class			
	2	7	8	9	10	12	17	22	29	1	3	6	13
	(per cent)												
Manufacturing	-	-	7.4	-	22.1	6.4	-	-	64.1	-	94.0	-	6.0
Other Industry	13.1	3.5	21.3	11.9	31.6	-	4.7	14.0	-	14.7	71.5	10.4	3.4
Commerce	-	-	30.7	-	52.0	-	-	8.7	8.5	-	76.3	13.7	19.0

Source: Department of Finance, Government of Canada.
- signifies not applicable.

Table 2-3

Investment Tax Credit Rates, 1980

Industry	Machinery CCA Class									Buildings CCA Class			
	2	7	8	9	10	12	17	22	29	1	3	6	13
	(per cent)												
Manufacturing	-	-	0.53	-	3.32	0.14	-	-	6.07	-	5.31	-	0.40
Other Industry	0.00	0.00	0.40	0.00	0.49	-	0.00	1.40	4.43	0.00	1.08	1.40	0.02
Commerce	-	-	0.27	-	0.57	-	-	7.00	4.84	-	0.75	0.74	0.03

Source: Department of Finance, Government of Canada.

Notes: Average effective ITCs were computed by the Department of Finance from its corporate tax model using a sample of tax returns. The ITC earned on each CCA class in 1980 was divided by the amount of additions (i.e., gross investment) in the same year. Table 2-2 identifies the main CCA classes for buildings and machinery in each industry and gives the distribution of additions among those main classes. The latter are defined as those CCA classes which together amount to at least 90 per cent of additions of assets of that type. Table 2-3 gives the ratio of ITC earned to additions for each main CCA class in 1981. These ITC rates were then aggregated for machinery and buildings in each industry.
- signifies not applicable.

3 THE CANADIAN TAX RATES

Effective Tax Rates in Canada

In this section we shall report on our calculations of effective tax rates, based on the statutory tax rates and the weighting described in Chapter 2 and Appendix C. As far as possible, our calculations reflect the tax legislation for 1980, and the asset and financing composition of corporations in 1980. This will permit us to compare our results with those of the four countries discussed in K&F [1984].

First we shall present our results on the assumption that all corporations make sufficient profits to take full advantage of all permitted deductions, such as accelerated depreciation allowances. Then we shall examine the results based on the opposite assumption; namely that the corporations make the investment, but are, generally speaking, in a zero profit situation, and consequently cannot take advantage of the above-mentioned tax deductions. Such "tax exhaustion" could be a significant problem in the absence of full loss offsets. During the period 1977 to 1982 almost half of all investment was undertaken by corporations which were rarely able to use their allowances.[6]

Profitable corporations

Table 3-1 contains the results of our calculations under the fixed-p assumption. Each column corresponds to a different assumption about inflation. Following K&F [1984] we performed calculations for zero inflation, 10 per cent inflation, and the actual average inflation rate for the period 1970-80 inclusive, namely 8.86 per cent. Under the last assumption the effective marginal tax rate of income from capital in Canada was 33.0 per cent. This should be interpreted as follows: if all investment projects had yielded 10 per cent before taxes, and all assets had been increased in the same proportions as the stock that prevailed in 1980, with the same ownership distribution and the same composition of financing methods, the additional tax payable would have amounted to 33.0 per cent of the resulting additional corporate revenues.

The first three rows of the table indicate the marginal effective tax rates on machinery, buildings, and inventories. They are weighted average rates, based on the distribution of capital stock by industry, source of finance, and ownership.

Not surprisingly, machinery enjoys a lower tax rate than do buildings or inventories due mainly to the accelerated depreciation allowances accorded to machinery. Under zero inflation, which may also be regarded as a simulation of a perfectly indexed

tax system, inventories are taxed more lightly than buildings because the latter bear most of the burden of property taxes. The table also indicates that the 3 per cent inventory allowance is not sufficient to protect inventories from being more heavily taxed when inflation mounts. Taxes on inventories rise sharply with inflation because inventories in Canada are valued on a FIFO basis for tax purposes.

When we examine marginal effective tax rates by industry, we find that manufacturing is taxed less than the other two aggregate industries; the latter being taxed at about the same rates. We find also that commerce is more heavily taxed as inflation increases than is other industry. This is due to the fact that the tax rate on inventories, which constitute a bigger proportion of the assets of commerce than of other industry, is higher than that on either machinery or buildings.

Table 3-1 also contains the marginal effective tax rates by source of finance. The tax rates on debt-financed investments are clearly lower than those of investments financed by the other two sources of funds, and decline with inflation. This is due to the fact that nominal interest paid by corporations is deductible for tax purposes as a business expense while there is no comparable deduction for equity.

Finally, Table 3-1 shows that capital income earned directly by households was subject to a marginal tax rate of 42.5 per cent at an annual inflation rate of 8.86 per cent. By contrast, savings channelled through tax-exempt institutions were taxed at a very low or slightly subsidized rate (depending upon the rate of inflation), while those chanelled through insurance companies received a substantial subsidy whatever the assumption about inflation. It is noteworthy that an increase in inflation reduces the tax or increases the subsidy for investments channelled through tax-exempt institutions and insurance companies, respectively.

The overall weighted average effective marginal tax rate of the 81 cases under consideration amounts to 33.0 per cent for the average inflation rate in the 1970-80 period. The last line of Table 3-1 indicates that the effective tax rate increases with inflation.

Using the same parameters we have repeated our calculations for the "fixed-r" case (Table 3-2). In this case the overall effective marginal tax rate is 45.3 per cent, assuming the average annual inflation for the period 1970-80. We can interpret this as follows: if the real return after corporate (but before personal) taxes were 5 per cent at zero inflation and all types of investment were increased in the same proportion as the capital stock prevailing in 1980, then at an annual inflation rate of 8.86 per cent the additional tax payable would have amounted to 45.3 per cent of pre-tax corporate revenues.

Here too we observe that the tax rates increase with inflation, but with the same exceptions as before: the savings chanelled through tax-exempt institutions and insurance companies and debt financing. As in the "fixed-p" case, machinery is taxed less than buildings and inventories, manufacturing less than the other two industries, and debt financing less than equities. In conclusion, our main findings remain unchanged, whether we adopt the "fixed-p" or "fixed-r" approach.

Tax exhaustion

Tables 3-1 and 3-2 present the tax rates calculated under the assumption that all corporations earn sufficient profits to take full advantage of accelerated depreciation and of investment tax credits. In this sense they represent an extreme case. The opposite extreme is represented in Table 3-3. Here we assume "fixed-p" and a case of "tax exhaustion," i.e., where corporations have such big accumulated losses that they never pay corporation taxes and therefore cannot utilize their investment tax credits. Comparing Table 3-3 with Table 3-1, i.e., with the corresponding case where corporations are able to take full advantage of deductions, we find the following:

a) The overall marginal tax rates are only moderately lower in Table 3-3. This indicates that the corporate income tax contributes relatively little to the overall tax rate, confirming

a similar finding for Canadian disaggregated manufacturing in D.J.M.S. [1985a].

b) The variation of the tax rates across assets, industry, source of finance and ownership in Table 3-3 is considerably lower than in Table 3-1. Remark that in the case presented in Table 3-1 we assume that all corporations make sufficient profit to be able to take full advantage of the accelerated depreciation allowance, investment tax credit and tax deductibility of interest payments. In the case presented in Table 3-3, tax exhaustion completely prevents the corporations from making the corresponding deductions. This shows that much of the variation in the effective marginal tax rates of profitable companies in Table 3-1 is due to the effects of accelerated depreciation allowances, the investment tax credit and the tax-deductibility of interest payments on corporate debt.

c) The overall tax rate increases faster with inflation in the tax exhaustion case of Table 3-3 than in the basic case of Table 3-1. This is caused by the sharp increase of the tax rate for projects financed by debt. Where companies are profitable, this rate declines with growing inflation; in the tax exhaustion case it rises sharply, because nominal interest paid can no longer be deducted as a business cost. A similar phenomenon was observed by K&F (1984) pp. 77-78, in the case of the United Kingdom.

The Impact of Some Recent Tax Changes on the Effective Marginal Tax Rates

The most important change influencing the taxation of capital income in Canada between 1980 and 1984 was the introduction of the "half-year rule." Prior to 1981 newly acquired capital assets enjoyed a full year's depreciation in the year of acquisition. Since then certain assets receive only a half year's depreciation allowance in the acquisition year. Table 3-4 column (1) contains the rates that would have prevailed under this rule, assuming the 1980 capital structure, the 1984 inflation rate, and the "fixed-p" assumption. Comparison with Table 3-1 indicates that the 1984 depreciation rules prevailing in 1984 do not completely counteract the tax-reducing effect of lower inflation, except in the case of machinery. Inventories, on the other hand, enjoy a much lower tax rate in Table 3-4, column (1), because of the lower inflation. The capital stock weighted standard deviation of the effective marginal tax rates of the 81 types of investment projects, a convenient measure of their dispersion, is 29.1. We shall use this figure as the benchmark against which we compare the effect of the tax changes discussed in the following paragraphs.

Table 3-4 column (2) introduces the most important change of capital income taxation contained in the 1985 budget. It assumes that all capital gains of the household sector are taxed at a zero rate at the personal level. This assumption probably exaggerates a little the effect of the $500,000 capital gain exemption. It is

a fundamental assumption of our methodology that retained earnings yield capital income in the form of capital gains. As expected, the budget change reduces the tax rate of retained earnings by about a quarter, and that of households by a lesser, but still substantial, one-fifth. The measure of dispersion in tax rates declines to 26.7.

We wish to emphasize that this result should not be regarded as an endorsement of the desirability of the tax exemption of capital gains. One could devise many other measures which would reduce the variation of tax rates among sources of finance. For instance, raising the tax on investments financed by debt relative to those financed by retained earnings, or a combination of a tax increase on debt finance with a lowering of the tax on capital gains would also serve such a purpose.

A Discussion Paper issued with the 1985 Federal Budget entitled The Corporate Income Tax System: A Direction for Change [Department of Finance, 1985] proposes a number of additional tax changes to reduce the variance in effective tax rates. We have calculated their effects separately, and they are listed in Table 3-4 columns (3) to (6).

The effect of the proposed statutory corporate income tax rates is shown in Column (3). Most rates show a moderate decline, compared to Column (2), but those projects which are currently

effectively subsidized (involving machinery, debt financing, tax exempt institutions, and insurance companies) find the value of their subsidies reduced and are now more heavily taxed. The overall tax rate is slightly lower than under the existing (1985) rules, and the dispersion in tax rates is reduced to 23.0. The reduction of the marginal rate itself reduces the dispersion in effective tax rates by: a) lowering the effective tax rates themselves, and b) lowering the value of subsidies now given through the tax system.

The reduced capital consumption allowances for machinery proposed in the Department of Finance Discussion Paper would mitigate the dispersion of tax rates among assets. Also, manufacturing being the most significant user of machinery, this proposed change would reduce the dispersion in effective tax rates among industries. (Compare Table 3-4, Columns (4) and (2).) The measure of dispersion would become 23.3 if this proposal were to be adopted.

Similarly, the proposed elimination of the investment tax credit would, by raising the tax rates on machinery more than on buildings and inventories, reduce the dispersion of the tax rates among assets and among industries to 24.6 (Compare Table 3-8 Columns (5) and (2)).

The proposed changes in capital consumption allowances, the reduction in statutory corporate tax rates and elimination of the investment tax credit tend to reduce the dispersion in the tax rate on new investments. By contrast, elimination of the inventory allowance would increase the dispersion, as can be seen by comparing columns (6) and (2). The dispersion measure after elimination of the inventory allowance is 27.6.

It should be noted that all three policy changes represented in Table 3-8 Columns (4) to (6) tend to raise the overall tax rate, thus counteracting the effects of the proposed tax rate reduction whose effects are shown in Column (3).

In Table 3-4 Column (7) we have combined the 1985 tax-exemption of the capital gains of households (Column 2) with the changes proposed in the Department of Finance Discussion Paper which are represented in Columns (3) to (6). Interestingly enough, the overall tax rate is the same as that under the 1984 tax rules (Column 1); that is, before the introduction of the $500,000 capital gain exemption. The composition of the tax rates, however, is very different. By raising the rate on machinery and lowering it on buildings the dispersion of the tax rates among assets is much reduced. Also, the dispersion in tax rates across industries is smaller; the rate on manufacturing is higher, those of other industry and commerce are lower. Again, a similar change can be observed among the sources of finance: in 1984 the

difference between the rates of the two most important sources of finance, debt and retained earnings, was 31.4 percentage points; in Column (7) this is reduced to 7.5 percentage points. All this reduces the advantages investments undertaken through tax-exempt institutions and insurance companies enjoy over direct investment by households, though the advantages are not eliminated. If the complete package of proposed reforms in the Budget Discussion Paper and the capital gains provision in the Budget itself are implemented, the dispersion in effective tax rates declines to 19.1.

Table 3-9 indicates that the results are robust, as they hold also under the fixed-r assumption.

The Welfare Loss due to the Dispersion of the Tax Rates

Our calculations of the 1980 Canadian marginal effective tax rates display a wide dispersion of the rates. We have mentioned before that such dispersion causes economic inefficiency. To adapt the excellent explanation of L.G. Rosenberg [1969]:

> Net returns to capital in the economy, after due allowance for differential risk factors and monopoly elements, tend to be equal at the margin. Gross returns are not likely to be equal unless the tax system is neutral and strikes the return of capital equally for all [investment projects]. In those [projects] favoured by the tax system, the rate of taxation of income from capital will be lower, and the tendency will be to overinvest, since the gross margin required to earn the

> net return will be lower. Capital will be attracted to those [projects]. The converse will be true for those [projects] that are at a disadvantage under a non-neutral tax system.

We have, therefore, reason to believe that there was a non-negligible Canadian welfare loss due to variance in effective tax rates in the tax system. In Appendix D we have made a rough calculation of this loss. Assuming the size and structure of the 1980 capital stock, and the 1984 tax regime and inflation rate applying for a sufficiently long period to permit the marginal effective tax rates to become average effective tax rates, the welfare loss under the "fixed-r" assumption (which is the proper assumption for welfare loss calculations) could amount to as much as $5.9 billion or 2.0 per cent of the 1980 Gross National Product. This calculation, as well as the following ones, is based solely on the tax rate dispersion between assets and industries. It does not attempt to assign a numerical value to the distortion in the debt/equity ratio caused by the differential tax treatment of financing, nor to the distortion resulting from the difference in tax laws applicable to the three types of ownership.

Our calculations assume an elasticity of substitution between capital and labour of unity; a plausible assumption in the light of the study of Rao and Preston [1983]. But even if we cut the assumed elasticity in half (which leads to a halving of the

welfare loss), the resulting loss remains $2.9 billion. Our calculations in this and the following chapter indicate that the main sources of the tax rate dispersion are accelerated depreciation allowances, the investment tax credit, the preferential tax treatment of debt financing compared to equity financing and, when inflation is high, the insufficient protection provided by the 3 per cent inflation allowance for inventories subject to FIFO rules. Clearly, these tax regulations imposed a considerable welfare loss on the Canadian economy.

If we restrict our attention to the welfare loss caused by the tax dispersion of investments in different assets and industries, we find that the effect of the $500,000 capital gain exemption on the marginal effective tax rate increases the welfare loss by almost 15 per cent to $6.8 billion (see Table D-4, column 2). This increase can be explained in the following manner. The budget reduces the tax rate on capital gains; that is, on retained earnings. The biggest user of retained earnings is manufacturing (see Appendix C, Table C-4a). The tax rate on manufacturing was already relatively low before the 1985 federal budget and has become even lower because of the budget. This increases the tax dispersion and the resulting welfare loss. The adoption of the complete policy package of proposals in the recent federal Budget Discussion Paper would reduce the welfare loss by almost 50 per cent. Nevertheless, we find that even in that case there would remain a welfare loss of about $2.8 billion or 1.0 per cent of GNP.

Table 3-1

Effective Marginal Tax Rates, Canada, 1980, Fixed-p Case

	Inflation Rate		
	Zero	10%	Actual (8.86%)
Asset			
Machinery	8.4	11.8	11.7
Buildings	41.3	44.8	45.0
Inventories	35.1	56.5	52.8
Industry			
Manufacturing	20.7	27.6	26.8
Other Industry	32.2	38.2	37.8
Commerce	28.8	39.5	38.0
Source of Finance			
Debt	11.7	4.8	5.5
New Share Issues	35.3	57.0	54.5
Retained Earnings	36.0	52.5	50.7
Owner			
Households	31.0	44.0	42.5
Tax-Exempt Institutions	4.8	-10.6	-8.9
Insurance Companies	-18.3	-65.4	-60.0
Overall	26.3	33.9	33.0

Source: Our calculations.

Table 3-2

Effective Marginal Tax Rates, Canada, 1980, Fixed-r Case

	Inflation Rate		
	Zero	10%	Actual (8.86%)
Asset			
Machinery	5.8	19.3	18.8
Buildings	47.8	53.3	53.3
Inventories	36.5	60.8	58.1
Industry			
Manufacturing	27.8	44.1	42.5
Other Industry	37.4	48.1	47.6
Commerce	34.3	48.1	46.7
Source of Finance			
Debt	18.3	7.1	8.1
New Share Issues	39.3	69.3	66.7
Retained Earnings	41.4	67.5	65.3
Owner			
Households	37.0	61.1	58.4
Tax-Exempt Institutions	14.6	3.9	4.5
Insurance Companies	- 7.5	-96.6	-86.8
Overall	32.6	46.5	45.3

Source: Our calculations.

Table 3-3

Effective Marginal Tax Rates, Fixed-p Case, Tax Exhaustion, Canada, 1980

	Inflation Rate		
	Zero	10%	Actual (8.86%)
Asset			
Machinery	14.8	26.1	24.9
Buildings	29.9	41.6	40.1
Inventories	15.3	27.3	26.0
Industry			
Manufacturing	18.6	29.3	28.2
Other Industry	20.0	31.2	30.0
Commerce	23.2	37.0	35.5
Source of Finance			
Debt	27.7	50.5	47.9
New Share Issues	15.5	25.6	24.4
Retained Earnings	15.3	18.7	18.4
Owner			
Households	23.8	38.7	37.1
Tax-Exempt Institutions	6.2	6.2	6.2
Insurance Companies	-18.2	-48.2	-44.7
Overall	20.3	31.9	30.6

Source: Our calculations.

Table 3-4

Effective Marginal Tax Rates, Canada, Fixed-p Case, 3.67% Inflation Rate

	(1) 1984 tax rules	(2) 1985 tax rules	(3) 1985 rules & reduced corp. tax rates	(4) 1985 rules & CCA rate changes	(5) 1985 rules & zero investment tax credit	(6) 1985 rules & zero inventory allowance	(7) 1985 rules & complete policy package
Asset							
Machinery	12.6	6.1	6.4	14.3	11.6	6.1	18.0
Buildings	44.9	39.5	36.7	39.5	41.6	39.5	38.9
Inventories	35.9	30.5	27.0	30.5	30.5	42.3	35.6
Industry							
Manufacturing	23.1	16.6	15.8	23.0	22.4	19.7	28.8
Other Industry	36.7	30.7	27.6	31.6	31.4	31.7	29.8
Commerce	32.0	27.2	25.9	28.4	28.3	31.3	30.3
Source of Finance							
Debt	9.3	9.3	16.4	12.9	12.5	12.5	24.0
New Share Issues	43.5	43.5	36.8	46.4	46.1	45.7	43.6
Retained Earnings	42.7	31.4	23.9	34.7	34.4	33.9	31.5
Owner							
Households	36.2	29.3	27.1	32.5	32.2	31.9	34.3
Tax-exempt Institutions	-0.6	-0.6	1.2	3.5	3.1	2.8	9.9
Insurance Companies	-35.1	-35.1	-33.7	-29.9	-30.5	-30.8	-22.4
Overall	29.5	23.6	22.0	27.0	26.6	26.3	29.5
Weighted Standard Deviation	29.1	26.7	23.0	23.3	24.6	27.6	19.1

Notes: Col. (1) 1980 capital structure, 1984 inflation rate, 1984 tax rules.
(2) as (1) but zero capital gains tax rate for households.
(3) as (2) but reduced corporate income rates as per Dept. of Finance [1985] p. 31.
(4) as (2) but with changed capital consumption allowances as per Dept. of Finance [1985] p. 32.
(5) as (2) but with zero investment tax credit, as per Dept. of Finance [1985] p. 32.
(6) as (2) but with zero inventory allowance, as per Dept. of Finance [1985] p. 32.
(7) = (2) + (3) + (4) + (5) + (6).

Table 3-5

Effective Marginal Tax Rates, Canada, 1980, Fixed-r Case, 3.67% Inflation Rate

	(1) 1984 tax rules	(2) 1985 tax rules	(3) 1985 rules & reduced corp. tax rates	(4) 1985 rules & CCA rate changes	(5) 1985 rules & zero investment tax credit	(6) 1985 rules & zero inventory allowance	(7) 1985 rules & complete policy package
Asset							
Machinery	19.4	2.5	3.5	15.8	16.0	2.5	24.7
Buildings	59.8	55.2	53.9	55.2	56.7	55.2	55.5
Inventories	41.0	29.8	29.3	29.8	29.8	54.3	48.1
Industry							
Manufacturing	38.4	26.2	25.2	32.2	35.0	36.5	43.7
Other Industry	50.6	43.1	40.7	43.9	44.0	45.2	43.7
Commerce	44.4	38.1	39.3	39.2	39.5	46.0	45.7
Source of Finance							
Debt	13.9	13.9	24.7	17.1	18.5	23.0	34.4
New Share Issues	59.3	59.3	54.1	60.9	61.5	62.7	60.8
Retained Earnings	60.5	48.0	40.9	50.3	51.3	53.5	51.2
Owner							
Households	54.3	45.1	44.3	47.5	48.5	51.2	53.1
Tax-exempt Institutions	8.9	8.9	7.4	12.1	12.9	15.1	17.7
Insurance Companies	-50.5	-50.5	-41.5	-44.6	-41.9	-34.1	-21.2
Overall	44.1	35.3	34.5	38.0	39.1	42.1	44.3
Weighted Standard Deviation	59.5	57.6	47.0	43.0	42.0	58.1	29.1

Notes: See Table 3-4.

4 DIFFERENCES BETWEEN THE FIVE COUNTRIES

International Comparison of the Basic Case Results

In Table 4-1 we present the Canadian "fixed-p" results together with those of the four countries reported by K&F [1984]. The overall marginal effective rate for Canada (33 per cent) is close to that of Sweden (36 per cent) and of the U.S.A. (37 per cent). West Germany's marginal rate is higher than that of all the other countries reported here, while that of the United Kingdom is lowest at less than 4 per cent. It should be emphasized that each country's tax rates were calculated using the inflation rate it experienced in the period 1970-80: 13.6 per cent for the U.K., 9.4 per cent for Sweden, 4.2 per cent for West Germany, 6.77 per cent for the U.S.A., and 8.86 per cent for Canada.

Examining the various rows of this table, we find that the similarity of the overall Canadian tax rate to those of Sweden and the U.S.A. hides pronounced differences of detail. Decomposing the overall effective tax rate by type of asset, we find that the effective marginal tax rate on machinery in Canada is close to that of the U.S.A. This is not surprising, because both countries use similar accelerated depreciation formulas as well as similar

corporation taxation systems and investment tax credits.[7] Note that the U.K. had the lowest marginal effective tax rate for machinery. This is due to the fact that the U.K. permitted the treatment of the purchase of machinery as if it were current expense and the total cost of the purchase could be immediately deducted from corporate taxable income. The Canadian effective tax rate for investment in buildings (45 per cent) is the highest among the five countries, but the tax rates on buildings do not differ much from country to country. The ranking of the tax rates on inventories shows what one would expect for countries which value one-half or more of their inventories on FIFO basis. Thus, Canada, Sweden and West Germany have the highest effective tax rates in this asset category. It is probably due to the 3 per cent inventory deduction that Canada's 53 per cent rate is the lowest among these three countries. Effective tax rates for this asset category are , as we have seen, very sensitive to inflation. The U.K. and the U.S.A., which permit Last In-First Out (LIFO) valuation, show the lowest tax rates for inventories.

Turning to effective tax rates by industry, we find that the Canadian rates resemble most those of Sweden. In fact, the two countries' effective tax rates are almost identical for manufacturing and commerce. It is also interesting to note that the U.S.A. is the only country in which the effective tax rate for manufacturing is higher than the overall rate.

Observing the tax rates by source of finance, we find that Canada shows the smallest variation. Table 4-1 shows that in all countries debt-financed investments are taxed less than those financed by new share issues or retained earnings. Debt-financed investment in Canada is taxed the highest among the five countries (5.5 per cent). In the U.K. debt-financed investments were heavily subsidized in 1980. Even financing by new share issues was slightly subsidized in the U.K. In all other countries studied, the tax rate on investments financed by new share issues is higher than the overall rate. Even with the dividend tax credit, investments financed by new share issues are taxed more heavily in Canada than those financed by retained earnings.

Finally, Table 4-1 shows the variation in marginal effective tax rates on investments by different categories of investors. The range of the tax rates on households is a reflection of differences in the various countries' personal tax rates. Appendix A contains the relevant parameters for Canada and the four countries analysed by King and Fullerton. It indicates that Sweden and West Germany have the highest marginal effective personal tax rates on interest income. This results in Swedish and West German households having higher marginal effective tax rates than their Canadian, U.K. and U.S. counterparts. Investments channeled through tax-exempt institutions do not incur personal income tax in Canada. As a consequence, they are slightly subsidized, since they can take advantage of accelerated depreciation and investment

tax credits. In the U.K., Sweden and the U.S.A. the tax deductions for interest payments, accelerated depreciation, investment tax credits, etc. are sufficiently high to yield a substantial net subsidy to investments by tax-exempt institutions.

The investment projects channeled through insurance companies enjoy a subsidy in three of the five countries studied. This is due to special provisions intended to help insurance companies to build up their reserves.

The tax rates contained in Table 4-1 are based on the assumption that all investment projects earn a real return of 10 per cent before taxes. As such, the rates do not reflect those necessarily observed in the economy, but rather describe the fiscal burdens and incentives businessmen and savers have to take into account in their decision-making. King and Fullerton have also simulated the marginal effective tax rates under the assumption that in equilibrium all new investment projects yield the same return after corporation tax but before personal tax. This is the assumption of "fixed-r" equilibrium. Table 4-2 contains the results for this case.

As mentioned before, the weighted average tax rates of the "fixed-r" case are generally higher than those of the corresponding "fixed-p" case. The overall tax rate for Canada (45 per cent) now differs a little more from those of the U.S.A. (50 per

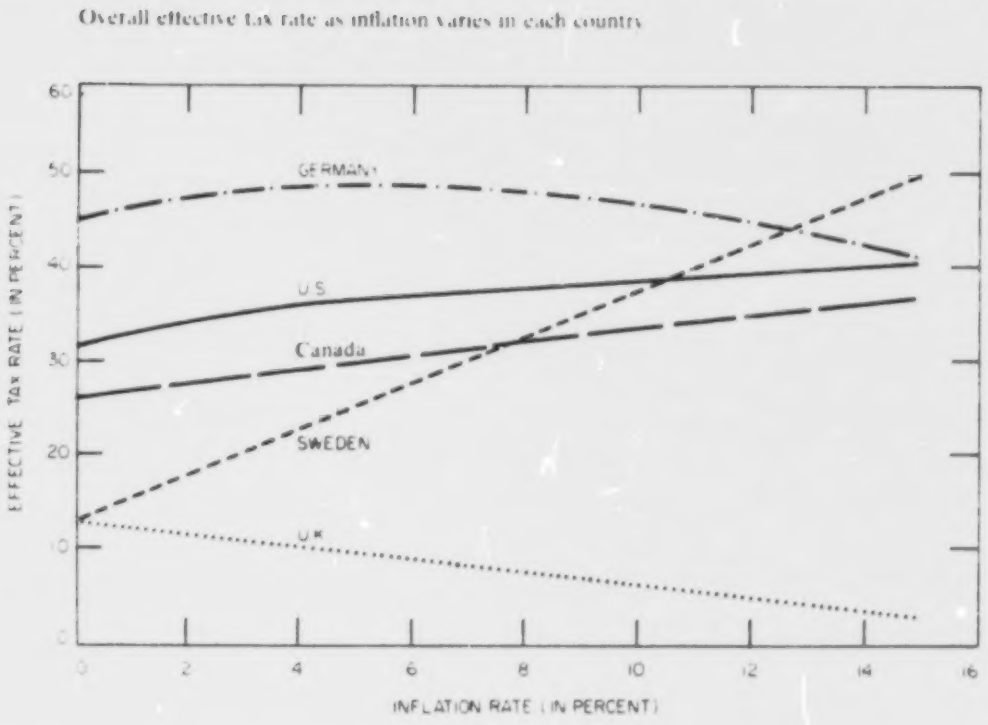
cent) and Sweden (54 per cent) than it did in the "fixed-p" case. The overall rate of the U.K. remains the lowest (30 per cent) and that of Sweden the highest (65 per cent). On the whole, the distribution of rates within a country and between countries remains unchanged.

The Effect of Inflation on Effective Marginal Tax Rates

In this section we shall examine in greater detail the effect of inflation on marginal effective tax rates. Chart 4-1, adapted from King and Fullerton, illustrates how the overall tax rate varies with inflation in the "fixed-p" case. We have added our results for Canada. Evidently, there are tremendous differences between countries in this respect. While in West Germany inflation hardly influences the overall effective tax rate, the corresponding rates of U.S.A. and Canada increase with inflation. The Swedish rate increases steeply with inflation. On the other hand, the U.K. is the only country in the study where inflation lowers the overall tax rate.

King and Fullerton discuss four different effects of inflation. First, the depreciation of certain assets is calculated on the basis of their acquisition price. Rising inflation reduces the real value of depreciation based on the original price, and, in consequence, increases the effective tax rate. As K&F [1984] p. 274 point out, however, rising inflation increases the marginal effective tax rate at a declining rate.

Chart 4-1



Source Adapted from King and Fullerton 1984

Second, the nominal interest rate rises with inflation, thereby increasing interest payments by corporations on their outstanding debt. This lowers the marginal effective tax rate, because the nominal interest payments of corporations are tax-deductible. We must also remember, however, that interest income received by households is also taxed at its nominal value; therefore, at the personal level inflation will raise the marginal effective tax rate. As in all five countries under discussion, the personal tax rate on interest income averaged over all investors is lower than statutory corporate tax rates, the combined net effect of inflation is to reduce the marginal effective tax rate on investments financed by debt.

Third, in countries such as Canada where FIFO inventory accounting is statutory, inflation increases the nominal value of profits and raises the marginal effective tax rate.

Finally, inflation can have a strong effect on the taxation of insurance companies. In 1980 American and Swedish insurance companies were allowed deductions for reserves that were based on statutorily fixed nominal interest rates. By contrast, the Canadian insurance companies are free to chose the interest rates on which their reserve deductions are based. As a result inflation tended to increase the effective tax rate of investments made by insurance companies in Sweden and in the U.S.A., but reduced it in Canada.

In Sweden the statutory tax rate of corporations is only slightly higher than that of households, and the effect of inflation on the tax rate of insurance companies is the inverse of that in Canada. These two effects together are sufficient to explain why inflation results in a faster increasing tax rate in Sweden (Chart 4-1).

On the whole, we can state that with inflation in Canada, the effect of FIFO treatment of inventories and the reduction in the real value of deductions for depreciation outweigh the effect of nominal interest payment deductions and of the favourable treatment of investments of tax-exempt institutions and of insurance companies. Hence inflation increases the effective tax rate on capital income.

Table 4-3 contains the change in marginal effective tax rates in the five countries if the inflation rate increases from 6 to 7 per cent. In Canada such an increase results in a 0.9 per cent rise in the overall marginal effective tax rate. Chart 4-1 shows that the overall effect places Canada between the U.S.A. and Sweden.

Table 4-3 indicates that there are no two countries which are consistently affected in the same way by an increase in inflation. (No two countries show consistently positive or negative signs for all corresponding cells in the table.) In the U.K. almost all rates fall, while in Sweden (with one exception) they increase.

In Canada the one percentage point increase in inflation increases the overall tax rate and also the tax rate of the majority of the aggregates in Table 4-3. The exceptions are: the tax on debt financing is slightly reduced, and the tax rates of tax-exempt institutions and insurance companies fall by 1.4 per cent and 4.5 percentage points respectively. The effect of inflation on the tax rate for assets shows great variation: that on inventories increases by 3.3 percentage points, while those on machinery and buildings rise only by 0.2 and 0.1 percentage points respectively.

Reasons for the International Differences

In this section we shall attempt to explain the differences between the effective tax rates on new investment prevailing in the five countries. In particular, we shall try to verify the extent to which these differences are due to the tax statutes of each country. Recall that in the calculations for each country its own inflation rate was used, together with its own structure of assets, industrial composition, financing, ownership, and economic depreciation rates; all of which factors have an influence on the tax rates. We shall attempt to separate the effects of these weights and parameters from those of the tax laws. It is a simple matter to calculate what would be the marginal effective tax rates in each country assuming identical parameters for inflation, weighting and economic depreciation. To do so, we have

followed K&F [1984], Chapter 7, by recalculating the tax rates of Canada using the inflation rate, economic depreciation rate, asset, industry, financing, and ownership structure of the U.S.A.

We begin by calculating the marginal effective tax rates under the assumptions that the composition of the industrial mix of the assets in industries, of sources of finance, and of ownership were the same as those of the United States. For each country we retained its own inflation rate and its own economic depreciation rate. Table 4-4 contains the results, assuming the "fixed-p" case.

On the whole, all the other countries experience increased marginal effective tax rates when subject to U.S. weights (compare Tables 4-1 and 4-4). This simulation increases the Canadian overall rate by 3.5 percentage points to 36.5 per cent. In the U.K. the overall tax rate becomes 12 per cent; in Sweden and West Germany 58 per cent. Canada is least affected among the four countries subject to changed weighting. In the United States inventories constitute a bigger share of assets in the manufacturing sector than in Canada (see Table A-4). As inventories in Canada are more heavily taxed than other assets, this has the effect of increasing the tax rate of manufacturing. Also, machinery, a relatively lightly taxed asset, has a lower weight in the U.S.A. than in Canada. Finally, debt financing plays a smaller role in U.S. than in Canadian manufacturing (Table A-4).

The Canadian tax rate on debt financing is relatively low, so application of the U.S. weights tends to increase the tax rate in manufacturing. All these factors work in the same direction; namely, to increase the overall effective tax rate in Canada. In the case of other industry we find that the adoption of U.S. weights lowers the Canadian tax rate. This industry category uses relatively more debt in the U.S.A. than it does in Canada, and debt is lightly taxed in both countries. Also, other industry has less inventories in the U.S.A., and investment in inventories is more heavily taxed in Canada. So this change too contributes to the lowering of the industry's tax rate.

The tax rates by asset and by source of finance are not much affected by the change in the weighting scheme. Tax rates for all ownership categories increase. This is due to the machinery and debt effects mentioned above.

Another cause of the international variation of tax rates is the differential inflation rate of the five countries discussed. A second simulation, imposing the U.S. (6.77 per cent) rate of inflation during the period 1970-80 on all five countries, yields the results in Table 4-5. As Canada's actual inflation rate of 8.86 per cent was similar to that of the U.S. for the period, the results are also similar to the Canadian base case. The only substantial change is that for inventories. The tax rate on this asset is very sensitive to inflation, due to the FIFO rules in force in Canada. In the other three countries the changes are

large. Even in West Germany, whose overall tax rate of 48 per cent remains unchanged, the tax rates by source of finance and by owner change substantially. As for the U.K. and Sweden, their overall tax rates are very sensitive to inflation (see Chart 4-1). The reduction of the U.K. inflation rate (13.6 per cent) to the 6.77 per cent U.S.A. rate reduces the U.K. subsidy of debt financing from 101 per cent to 65 per cent. The Swedish inflation rate during the period 1970-80 was actually 9.4 per cent. Reducing it to 6.77 per cent lowers the tax on FIFO valued Swedish inventories and on nominally valued interest and dividend income (K&F [1984], p. 136).

In Table 4-6 we tabulate the marginal effective tax rates obtained under the assumption that all countries face the same declining balance economic depreciation rates as the U.S.A. (compare Table 4-6 with Table 3-4). K&F [1984] pp. 281-282 concluded that differences in actual economic depreciation rates on the whole explain only a small fraction of the international differences in tax rates. Also, the results obtained for the U.S.A. were robust under widely varying economic depreciation assumptions.[8] Our results for Canada confirm this finding. This strengthens our confidence in our calculations. (The Statistics Canada economic life assumptions differ from the Hulten-Wykoff depreciation rates used in K&F [1984]).

In Table 4-7 we combine the changes of the previous three simulations; that is, we impose the weighting scheme, the inflation rate and the economic depreciation rates of the U.S.A. simultaneously, on all five countries. Evidently, all remaining differences in effective marginal tax rates are now exclusively due to the tax laws of each country. For all countries other than the U.S.A. the general effect is to raise the overall tax rate above that which prevailed when using its own parameters. In Canada the overall tax rate changes very little, but the distribution among the 12 component rates now resembles more closely that of the U.S.A. In particular, the Canadian tax rates of the various asset types are now very similar to those in the U.S.A.

At the industry level, the Canada-U.S. difference in the tax treatment of manufacturing and of other industry remains substantial. The remaining differences in the tax rates by source of finance and by ownership confirm that these are mainly due to the respective tax laws of the two countries. Table 4-8, which contains the same assumptions as Table 4-7, but for the "fixed-r" case, leads to the same conclusions, and confirms once more that our results are robust with respect to the presence or absence of arbitrage assumptions.

International Comparison of Dispersion of Effective Marginal Tax Rates

K&F [1984] pp. 297-302 investigated the dispersion of the effective marginal capital income tax rates of four industrial countries. Recall that their (and our) study calculates 81 tax rates (3 assets x 3 industries x 3 sources of finance x 3 types of owners). The 12 tax rates quoted in our tables are weighted averages of these 81 rates, where the weights are the percent of corporate capital employed in each of the combinations. The dispersion of the 81 categories is even bigger than of the 12 aggregate tax rates. The highest rate (81.7 per cent) is that for investment in inventories in manufacturing, financed by new shares and owned by households; while the lowest (-158.0 per cent) is for investment in machinery in manufacturing, financed by new shares and owned by insurance companies. We list the 81 rates in Appendix B for zero, ten per cent, and actual 1970-80 (8.86 per cent) inflation.

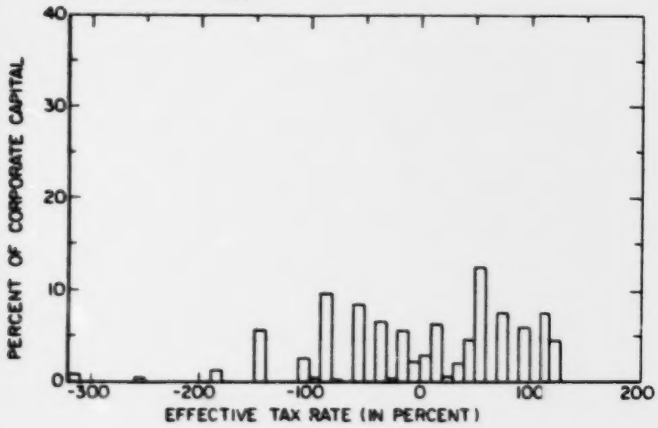
An international comparison of the dispersion in tax rates is presented in Chart 4-2. This demonstrates that Canada, while by no means uniform in taxing corporate investment, shows the least dispersion in tax rates of the five countries discussed. This is interesting because K&F [1984] pp. 301-302 suggest a possible implication of effective tax rates for growth. They found that among the four countries they investigated, the average 1960-80 growth rate of the economies showed perfect positive rank

correlation with the level of the overall effective marginal tax rate, but a perfect negative one with the dispersion, as measured by the weighted coefficient of variation. They conjecture that the inefficiency caused by the dispersion of tax rates is a more important force in retarding economic growth than is high taxation. Reproducing their table and adding our Canadian results (Table 4-9) we find that Canada had the highest growth rate of real Gross Domestic Product, the second lowest rate of effective taxation, the lowest dispersion of taxes as measured by the weighted standard deviation, and the second lowest dispersion of taxes if measured by the coefficient of variation (the weighted standard deviation divided by the overall effective tax rate). While the perfect negative rank correlation of the growth rate with the coefficient of variation found by K&F [1984] is no longer preserved, the coefficients of variation of the two countries with highest economic growth (Canada and West Germany) are very close.

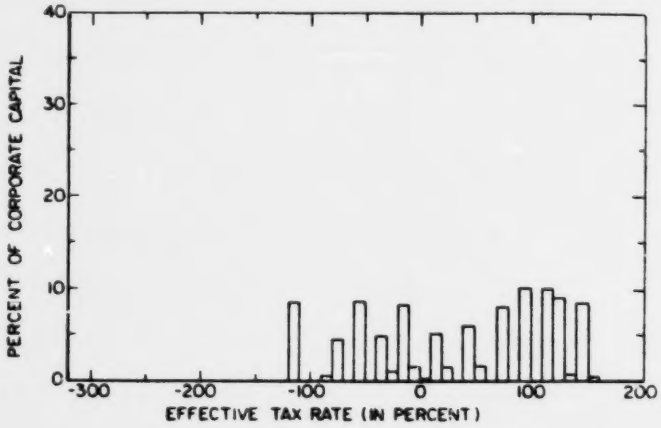
Chart 4-2

Comparisons of Effective Tax Rates

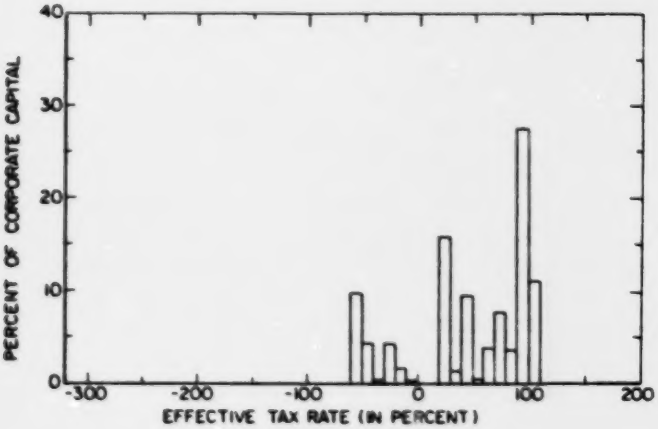
Proportion of investment taxed at each rate in the fixed-*p* case for the United Kingdom.



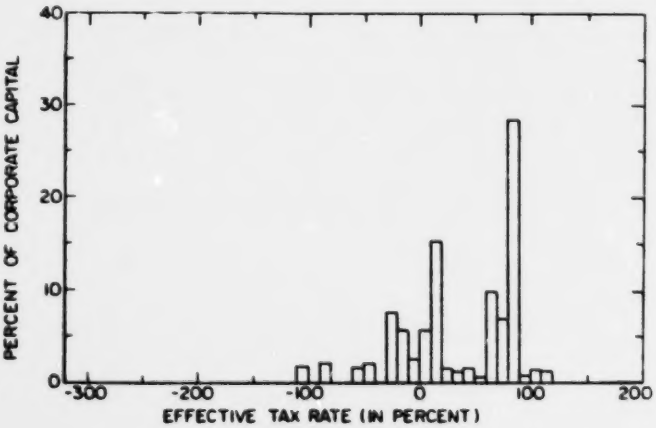
Proportion of investment taxed at each rate in the fixed-*p* case for Sweden.



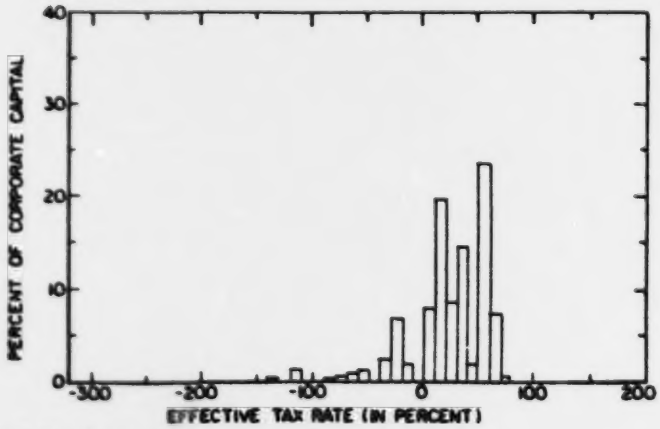
Proportion of investment taxed at each rate in the fixed-*p* case for West Germany.



Proportion of investment taxed at each rate in the fixed-*p* case for the United States.



Proportion of investment taxed at each rate in the fixed-*p* case for Canada



Source King and Fullerton and our calculations

Table 4-1

Actual Effective Tax Rates for Each Country, Fixed-p Case (Actual Inflation, Actual Economic Depreciation, Actual Weights)

	Canada	United Kingdom	Sweden	West Germany	United States
Asset					
Machinery	11.7	-36.8	0.2	44.5	17.6
Buildings	45.0	39.3	36.6	42.9	41.1
Inventories	52.9	39.5	68.8	59.0	47.0
Industry					
Manufacturing	26.8	-9.6	27.1	48.1	52.7
Other Industry	37.8	-5.4	60.5	57.0	14.6
Commerce	38.0	36.2	39.2	44.4	38.2
Source of Finance					
Debt	5.5	-100.8	5.0	-3.1	-16.3
New Share Issues	54.5	-4.2	90.4	62.6	91.2
Retained Earnings	50.7	30.6	68.2	90.2	62.4
Owner					
Households	42.5	42.0	105.1	71.2	57.5
Tax-exempt Institutions	-8.9	-44.6	-51.8	6.3	-21.5
Insurance Companies	-60.0	-6.7	18.9	-3.8	23.4
Overall	33.0	3.7	35.6	48.1	37.2

Source: Canada, Our Calculations; Other Countries, King and Fullerton [1984], Table 7.1

Table 4-2

Actual Effective Tax Rates for Each Country, Fixed-r Case (Actual Inflation, Actual Economic Depreciation, Actual Weights)

	Canada	United Kingdom	Sweden	West Germany	United States
Asset					
Machinery	18.8	-57.5	-0.7	63.4	26.4
Buildings	53.3	56.4	48.5	59.9	54.1
Inventories	58.1	45.9	72.5	70.4	54.5
Industry					
Manufacturing	42.5	10.7	45.1	65.0	61.2
Other Industry	47.6	12.0	77.0	69.5	24.4
Commerce	46.7	55.0	53.7	61.3	48.8
Source of Finance					
Debt	8.1	-	11.5	-17.9	-72.5
New Share Issues	66.7	-1.8	92.9	73.2	81.8
Retained Earnings	65.3	48.2	89.6	85.4	66.5
Owner					
Households	58.9	104.6	141.0	82.4	73.4
Tax-exempt Institutions	4.5	-34.5	-68.8	26.5	-21.3
Insurance Companies	-86.8	14.5	26.9	9.1	22.4
Overall	45.3	30.0	53.6	64.8	49.9

Source: Canada, Our Calculations; Other Countries, King and Fullerton [1984], Table 7.2

Table 4-3

Change in Effective Tax Rates for a Change in the Inflation Rate from 6 Percent to 7 Percent, Fixed-p Case (Actual Economic Depreciation, Actual Weights)

	Canada	United Kingdom	Sweden	West Germany	United States
			(Percentage Points)		
Asset					
Machinery	0.2	-1.0	2.0	0.5	1.8
Buildings	0.1	-0.2	0.9	-1.9	0.4
Inventories	3.3	-0.8	4.1	0.3	-0.5
Industry					
Manufacturing	0.9	-0.6	1.9	-0.1	0.8
Other Industry	0.5	-0.7	3.3	0.2	0.4
Commerce	1.3	-0.8	2.7	-1.3	-0.2
Source of Finance					
Debt	-0.5	-5.2	2.0	-5.1	-2.0
New Share Issues	2.3	-0.9	4.8	0.7	4.3
Retained Earnings	1.7	0.5	2.6	3.7	1.5
Owner					
Households	1.4	1.1	5.0	2.0	1.6
Tax-exempt Institutions	-1.4	-3.0	-1.6	-4.1	-4.5
Insurance Companies	-4.5	-1.1	4.2	-5.9	5.0
Overall	0.9	-0.6	2.4	-0.2	0.4

Source: Canada: Our Calculations, Other Countries: King and Fullerton [1984], Table 7.4

Table 4-4

Effective Tax Rates for Each Country, with United States Weights, Fixed-p Case (Actual Inflation, Actual Economic Depreciation)

	Canada	United Kingdom	Sweden	West Germany	United States
Asset					
Machinery	9.6	-45.5	25.7	54.6	17.6
Buildings	40.4	24.8	58.4	52.5	41.1
Inventories	53.0	35.8	87.6	71.5	47.0
Industry					
Manufacturing	43.6	22.0	66.6	69.2	52.7
Other Industry	24.9	-13.6	44.4	43.6	14.6
Commerce	38.4	24.8	59.8	54.3	38.2
Source of Finance					
Debt	2.3	-84.1	29.4	2.1	-16.3
New Share Issues	55.9	46.9	109.6	63.2	91.2
Retained Earnings	53.8	61.5	69.6	87.5	62.4
Owner					
Households	52.2	48.3	103.0	73.3	57.5
Tax-exempt Institutions	16.8	-82.6	-65.2	31.6	-21.5
Insurance Companies	-47.7	-46.5	7.7	-9.1	23.4
Overall	36.5	11.6	58.0	57.5	37.2

Source: Canada, Our Calculations; Other Countries, King and Fullerton [1984], Table 7.5

Table 4-5

Effective Tax Rates for Each Country, with 6.77 Percent Inflation, Fixed-p Case (Actual National Economic Depreciation, Actual National Weights)

	Canada	United Kingdom	Sweden	West Germany	United States
Asset					
Machinery	11.4	-30.2	-5.2	46.3	17.6
Buildings	45.0	42.0	33.9	38.9	41.1
Inventories	46.0	45.5	58.6	59.8	47.0
Industry					
Manufacturing	25.1	-4.8	22.1	48.2	52.7
Other Industry	37.1	0.2	51.7	58.3	14.6
Commerce	35.3	42.2	32.2	41.8	38.2
Source of Finance					
Debt	6.7	-64.6	-0.6	-15.4	-16.3
New Share Issues	49.9	2.1	77.8	64.6	91.2
Retained Earnings	47.3	27.9	61.8	100.1	62.4
Owner					
Households	39.7	34.8	92.1	76.5	57.5
Tax-exempt Institutions	-6.0	-23.8	-47.7	-3.4	-21.5
Insurance Companies	-50.4	1.9	6.6	-18.2	23.4
Overall	31.4	8.9	29.5	47.9	37.2

Source: Canada, Our Calculations; Other Countries, King and Fullerton [1984], Table 7.6

Table 4-6

Effective Tax Rates for Each Country, with United States Economic Depreciation Rates, Fixed-p Case (Actual Inflation, Actual Weights)

	Canada	United Kingdom	Sweden	West Germany	United States
Asset					
Machinery	14.3	-42.2	-0.8	53.8	17.6
Buildings	42.1	39.7	38.3	42.0	41.1
Inventories	52.8	39.5	68.8	75.4	47.0
Industry					
Manufacturing	27.1	-13.5	27.2	69.3	52.7
Other Industry	37.6	-5.1	61.2	32.5	14.6
Commerce	38.0	36.1	39.7	48.2	38.2
Source of Finance					
Debt	5.5	-104.2	5.4	-20.3	-16.3
New Share Issues	54.6	-6.6	90.6	59.2	91.2
Retained Earnings	50.8	28.5	68.3	92.2	62.4
Owner					
Households	42.6	40.0	105.3	73.3	57.5
Tax-exempt Institutions	-8.9	-47.5	-51.4	19.3	-21.5
Insurance Companies	-59.9	-9.2	19.2	-37.2	23.4
Overall	33.1	1.3	35.9	52.6	37.2

Source: Canada, Our Calculations; Other Countries, King and Fullerton [1984], Table 7.7

Table 4-7

Effective Tax Rates for Each Country, with 6.77 Percent Inflation, United States Economic Depreciation, and United States Weights, Fixed-p Case

	Canada	United Kingdom	Sweden	West Germany	United States
Asset					
Machinery	12.5	-37.3	.9.0	53.8	17.6
Buildings	38.4	31.7	56.0	42.0	41.1
Inventories	46.2	43.3	76.7	75.4	47.0
Industry					
Manufacturing	40.1	21.0	60.9	69.3	52.7
Other Industry	25.4	1.1	40.2	32.5	14.6
Commerce	35.6	37.4	53.5	48.2	38.2
Source of Finance					
Debt	4.2	-45.0	22.0	-20.3	-16.3
New Share Issues	50.9	40.4	96.4	59.2	91.2
Retained Earnings	49.7	52.4	65.9	92.2	62.4
Owner					
Households	48.4	43.3	92.5	73.3	57.5
Tax-exempt Institutions	16.7	-43.6	-52.4	19.3	-21.5
Insurance Companies	-39.3	-19.8	-3.6	-37.2	23.4
Overall	34.4	18.9	52.6	52.6	37.2

Source: Canada, Our Calculations; Other Countries, King and Fullerton [1984], Table 7.8

Table 4-8

Effective Tax Rates for Each Country, with 6.77 Percent Inflation, United States Economic Depreciation, and United States Weights, Fixed-r Case

	Canada	United Kingdom	Sweden	West Germany	United States
Asset					
Machinery	19.0	-61.5	30.1	69.2	26.4
Buildings	47.4	51.7	69.5	59.2	54.1
Inventories	52.6	51.1	81.5	79.3	54.5
Industry					
Manufacturing	51.1	43.3	78.7	77.8	61.2
Other Industry	33.1	25.0	55.9	51.4	24.4
Commerce	44.4	54.7	68.3	64.9	48.8
Source of Finance					
Debt	3.7	-114.5	27.4	-125.5	-72.5
New Share Issues	59.2	55.0	93.5	71.4	81.8
Retained Earnings	59.0	64.5	88.2	86.6	66.5
Owner					
Households	64.7	63.9	120.7	84.8	73.4
Tax-exempt Institutions	25.6	-33.5	-65.2	39.7	-21.3
Insurance Companies	-56.8	-14.0	-6.0	-45.3	22.4
Overall	44.4	42.3	69.8	68.4	49.9

Source: Canada, Our Calculations; Other Countries, King and Fullerton [1984], Table 7.9

Table 4-9

Selected Economic Indicators

	Canada	United Kingdom	Sweden	West Germany	United States
Average annual growth of GDP in constant prices (1960-80) per cent	4.7	2.3	3.2	3.7	3.5
Weighted standard deviation of 1980 tax rates	39.2	86.2	82.9	53.5	52.5
Coefficient of variation	118.7	2314.9	232.7	111.2	140.9
Overall effective tax rate 1980	33.0	3.7	35.6	48.1	37.2

Source: Our calculations, and King and Fullerton [1984], p. 301.

5 SUMMARY AND CONCLUSIONS

This study extends the investigation of Canadian capital income taxation beyond that of disaggregated manufacturing as discussed in D.J.M.S. [1985a] to other industries (construction, transportation, storage, communication and utilities) and to commerce (trade, and nonfinancial services). Also it compares the Canadian results with those of four countries (U.K., Sweden, West Germany, U.S.A) discussed in K&F [1984]. Our main findings are as follows:

1) In 1980, the most recent year for which comparisons are possible, the dispersion of total marginal effective tax rates in Canada was large.

2) In Canada the dispersion grows when inflation increases.

3) The corporation tax accounts only for a small fraction of the capital income tax, but causes a great part of the dispersion of tax rates (and consequent economic inefficiency). This is primarily due to the tax rules for accelerated depreciation, investment tax credits, the differential treatment of debt versus equity financing, and the preferential treatment given to manufacturing and processing.

4) Points 1) to 3) hold true under fixed-p or fixed-r assumptions, i.e., under alternative arbitrage assumptions.

5) Points 1) to 4) confirm the corresponding findings for disaggregated manufacturing reported in D.J.M.S. [1985a]. Thus they extend those results from the approximately 25 per cent of private GNP represented by manufacturing to about 60 per cent of GNP.

6) The capital tax system of 1984 could have resulted in a welfare loss of $6 billion equivalent to 2 per cent of GNP.

7) The effect of the capital gain exemption introduced by the 1985 federal budget increases the loss by 15 per cent to $6.8 billion, or 2.3 per cent of GNP.

8) The proposed capital income tax changes described in the Discussion Paper tabled with the 1985 budget would reduce the welfare loss to $2.9 billion or 1.0 per cent of GNP.

9) The remaining welfare loss is due to the continuing preferential tax treatment of machinery over buildings and inventories, of the preferential treatment of debt financing over equity

financing, to the tax advantages accorded to tax-exempt institutions and insurance companies, and to low taxation of manufacturing and processing and of small businesses.

10) Canada's marginal effective tax rate of income from capital in 1980 was lower than that of Sweden, West Germany, or the U.S.A.

11) The dispersion of tax rates was lower in Canada than that in the four other countries.

12) The overall Canadian tax rate rose more steeply with increasing inflation than that in any of the other countries, with the exception of Sweden.

13) The bulk of the difference between the Canadian and foreign tax rates could not be ascribed to differences in their respective inflation rates, nor to differences in assumptions about the economic life of assets, nor to different industrial composition of the GNP in the five countries, nor to different asset composition of investment, nor to differences in financing, nor to differences in ownership, nor to a combination of these factors. The difference in tax rates was, therefore, due in large part to

differences between the Canadian and foreign tax statutes. This conclusion, too, is valid under both "fixed-p" and "fixed-r" arbitrage assumptions.

APPENDIX A

Table A-1

Specific Tax and Inventory Parameters

	Canada	United Kingdom	Sweden	West Germany	United States
τ (Corporation income tax rate)					
Manufacturing	0.4110	0.5200	0.3490[a]	0.6200	0.4950
Other Industry	0.3805	0.5200	0.3490[a]	0.6200	0.4950
Commerce	0.3159	0.5200	0.3490[a]	0.6200	0.4950
τ^* (Insurance Companies corporate income tax rate)	0.4909	n/a	n/a	n/a	n/a
θ (Discrimination factor against dividends)	1.5000	1.4290	1.0000	2.2727	1.0000
Π (Inflation rate)	0.0886	0.1357	0.0940	0.0420	0.0677
v (Proportion of inventories taxed under FIFO)	1.0000	0.0	1.0000	0.5000	0.0
Corporate Wealth Tax Rates (W_c)					
Machinery					
Manufacturing	0.0000	0.0000	0.0000	0.0096	0.00768
Other Industry	0.0000	0.0000	0.0000	0.0096	0.00768
Commerce	0.0000	0.0000	0.0000	0.0096	0.00768
Buildings					
Manufacturing	0.0185	0.0246	0.0000	0.0029	0.01126
Other Industry	0.0113	0.0246	0.0000	0.0029	0.01126
Commerce	0.0282	0.0246	0.0000	0.0029	0.01126
Inventories					
Manufacturing	0.0000	0.0000	0.0000	0.0096	0.00768
Other Industry	0.0000	0.0000	0.0000	0.0096	0.00768
Commerce	0.0000	0.0000	0.0000	0.0096	0.00768

a Estimated at 9.4 per cent inflation. See K&F, pp. 100-103.

Source: Canada: see text.
Other countries: K&F [1984], Appendix A, Table A1.

Table A-2

Tax Parameters, by Source of Finance

	CANADA			UNITED KINGDOM			SWEDEN			WEST GERMANY			UNITED STATES		
	Debt	New Shares	Retained Earnings	Debt	New Shares	Retained Earnings	Debt	New Shares	Retained Earnings	Debt	New Shares	Retained Earnings	Debt	New Shares	Retained Earnings
Personal Tax Rates (Wp)															
Households	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.006	0.017	0.017	0.005	0.005	0.005	0.0000	0.0000	0.0000
Tax-Exempt Institutions	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.0000	0.0000	0.0000
Insurance Companies	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	0.000	0.000	0.007	0.007	0.007	0.0000	0.0000	0.0000
Tax Rates on Interest (m)															
Households	0.2905	0.4228	0.4228	0.3055	0.4500	0.4500	0.492	0.640	0.640	0.398	0.480	0.480	0.284	0.475	0.475
Tax-Exempt Institutions	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	0.400	0.400	0.000	0.000	0.000
Insurance Companies	0.0000	0.0000	0.0000	0.2328	0.1765	0.1765	(0.1050+ 1.9400π)	(0.1060+ 1.3600π)	(0.1060+ 1.3600π)	0.028	0.028	0.028	(0.1490+ 3.8800π)	0.069	0.069
Tax Rate on Capital Gains (Zs)															
Households	0.2106	0.2106	0.2106	0.2832	0.2832	0.2832	0.26	0.26	0.26	0.0000	0.0000	0.0000	0.14	0.14	0.14
Tax-Exempt Institutions	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00	0.00	0.00
Insurance Companies	0.24545	0.24545	0.24545	0.1765	0.1765	0.1765	(0.0500+ 1.5000π)	(0.0500+ 1.5000π)	(0.0500+ 1.5000π)	0.0000	0.0000	0.0000	0.28	0.28	0.28

Source: Canada (see text). Other countries: K&F (1984), Appendix A, Table A2.

Table A-3

Parameters for Each Asset, by Industry

	CANADA			UNITED KINGDOM			SWEDEN			WEST GERMANY			UNITED STATES		
	Manufacturing	Other Industry	Commerce	Manufacturing	Other Industry	Commerce	Manufacturing	Other Industry	Commerce	Manufacturing	Other Industry	Commerce	Manufacturing	Other Industry	Commerce
Depreciation Rates (δ)															
Machinery	0.0971	0.1103	0.1402	0.0819	0.1535	0.0831	0.077	0.197	0.182	0.1566	0.1566	0.1566	0.1331	0.1302	0.1710
Buildings	0.0452	0.0389	0.0399	0.0250	0.0250	0.0250	0.026	0.025	0.018	0.0456	0.0456	0.0456	0.0343	0.0304	0.0247
Inventories	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	0.000	0.000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Proportion Immediate Depreciation (f_2)															
Machinery	0.0390	0.0060	0.0123	1.0000	1.0000	1.0000	0.3000	0.3000	0.3000	0.0	0.0000	0.0000	0.0000	0.0000	0.0000
Buildings	0.0000	0.0000	0.0000	0.5000	0.5000	0.0100	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Inventories	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.193	0.6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Proportion with Later Depreciation (f_1)															
Machinery	0.9610	0.9940	0.9877	0.0000	0.0000	0.0000	0.7000	0.7000	0.7000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Buildings	1.0000	1.0000	1.0000	0.5000	0.5000	0.0400	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Inventories	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Lifetimes (L)															
Machinery	-	-	-	-	-	-	-	-	-	11	11	11	-	-	-
Buildings	-	-	-	12	12	12	28	53	36	30	30	30	-	-	-
Type of Depreciation*															
Machinery	5	5	5	0	0	0	0	0	0	2	2	2	4	4	4
Buildings	5	5	5	1	1	1	3	3	3	1	1	1	4	4	4
Inventories	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* Key: 0 = exponential; 1 = straight-line; 2 = declining balance/straight-line; 3 = straight-line with extra 2 per cent for five years; 4 = United States only; 5 = Canada only.

Table A-3 (continued)

Parameters for Each Asset, by Industry

	CANADA			UNITED KINGDOM			SWEDEN			WEST GERMANY			UNITED STATES		
	Manu-facturing	Other Industry	Commerce	Manu-facturing	Other Industry	Commerce	Manu-facturing	Other Industry	Commerce	Manu-facturing	Other Industry	Commerce	Manu-facturing	Other Industry	Commerce
Exponential Tax Depreciation Rate (α)															
Machinery	-	-	-	-	-	-	0.3000	0.3000	0.3000	-	-	-	-	-	-
Buildings	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Inventories	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Proportion with Investment Grant (f_3)															
Machinery	1.0000	1.0000	1.0000	0.323	0.0004	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Buildings	1.0000	1.0000	1.0000	0.821	0.0070	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Inventories	1.0000	1.0000	1.0000	0.000	0.0000	0.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Rate of Investment Grant (g)															
Machinery	0.0467	0.0044	0.0140	0.1946	0.1946	0.0000	0.114	0.114	0.114	0.021	0.007	0.007	0.0959	0.0902	0.0857
Buildings	0.0502	0.0092	0.0068	0.1476	0.1476	0.0000	0.057	0.057	0.057	0.021	0.007	0.007	0.0000	0.0978	0.0000
Inventories	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	0.0000	0.0000	0.0000

Source: Canada (see text). Other countries: K&F (1984), Appendix A, Table A3.

Table A-4

Weights

	CANADA			UNITED KINGDOM			SWEDEN			WEST GERMANY			UNITED STATES		
	Manufacturing	Other Industry	Commerce	Manufacturing	Other Industry	Commerce	Manufacturing	Other Industry	Commerce	Manufacturing	Other Industry	Commerce	Manufacturing	Other Industry	Commerce
Proportion of Capital Stock															
Machinery	0.2208	0.1101	0.0824	0.298	0.090	0.080	0.2635	0.0253	0.0345	0.3648	0.0243	0.0281	0.0867	0.0965	0.0415
Buildings	0.1183	0.1615	0.0759	0.171	0.022	0.139	0.2127	0.0662	0.0620	0.2089	0.0266	0.0641	0.2167	0.1970	0.1248
Inventories	0.0998	0.0239	0.1073	0.135	0.005	0.080	0.1496	0.0957	0.0905	0.2378	0.0060	0.0414	0.1350	0.0176	0.0842
Proportion by Source of Finance															
Debt	0.3470	0.3740	0.5090	0.193	0.193	0.193	0.405	0.812	0.625	0.4354	0.3123	0.4956	0.1981	0.4847	0.3995
New Share Issues	0.0890	0.0840	0.0660	0.044	0.044	0.044	0.024	0.009	0.018	0.0491	0.0599	0.0439	0.0592	0.0381	0.0443
Retained Earnings	0.5650	0.5420	0.4250	0.763	0.763	0.763	0.571	0.179	0.357	0.5155	0.6278	0.4605	0.7427	0.4772	0.5562
Ownership Shares Debt															
Households	0.784	0.784	0.784	0.718	0.718	0.718	0.252	0.752	0.482	0.563	0.563	0.563	0.6896	0.6896	0.6896
Tax-Exempt Institutions	0.156	0.156	0.156	0.137	0.137	0.137	0.672	0.199	0.476	0.336	0.336	0.336	0.2371	0.2371	0.2371
Insurance Companies	0.060	0.060	0.060	0.145	0.145	0.145	0.076	0.051	0.042	0.121	0.121	0.121	0.1534	0.1534	0.1534
New Shares															
Households	0.895	0.895	0.895	0.435	0.435	0.435	0.810	0.816	0.816	0.798	0.617	0.751	0.7433	0.7433	0.7433
Tax-Exempt Institutions	0.085	0.085	0.085	0.407	0.407	0.407	0.302	0.302	0.302	0.186	0.298	0.189	0.2154	0.2154	0.2154
Insurance Companies	0.020	0.020	0.020	0.157	0.157	0.157	0.094	0.094	0.094	0.056	0.085	0.060	0.0412	0.0412	0.0412
Retained Earnings															
Households	0.895	0.895	0.895	0.435	0.435	0.435	0.808	0.808	0.808	0.798	0.617	0.751	0.7433	0.7433	0.7433
Tax-Exempt Institutions	0.085	0.085	0.085	0.407	0.407	0.407	0.302	0.302	0.302	0.186	0.298	0.189	0.2154	0.2154	0.2154
Insurance Companies	0.020	0.020	0.020	0.157	0.157	0.157	0.094	0.094	0.094	0.056	0.085	0.060	0.0412	0.0412	0.0412

Source: Canada (see text). Other countries: K&F (1984), Appendix A, Table A4.

APPENDIX B

Table B-1

Total Effective Marginal Capital Income Tax Rates, Canada, 1980, Fixed-p

J	K	M	L	Inflation zero	Inflation 10%	Inflation 8.86%	Capital Stock weight %
1	1	1	1	-15.2	-25.3	-24.0	60.1
1	1	1	2	17.2	38.1	35.8	17.4
1	1	1	3	16.5	30.1	28.8	111.7
1	1	2	1	-62.3	-117.6	-111.0	12.0
1	1	2	2	4.4	13.2	12.4	1.7
1	1	2	3	4.4	13.2	12.4	10.6
1	1	3	1	-62.3	-117.6	-111.0	4.6
1	1	3	2	-87.8	-167.4	-158.0	0.4
1	1	3	3	-67.4	-139.7	-131.1	2.5
1	2	1	1	12.4	11.2	11.7	32.3
1	2	1	2	33.8	57.3	54.9	8.3
1	2	1	3	34.1	51.3	49.8	53.4
1	2	2	1	-23.5	-66.1	-60.7	6.4
1	2	2	2	23.7	35.3	34.4	0.8
1	2	2	3	23.7	35.3	34.4	5.1
1	2	3	1	-23.5	-66.1	-60.7	2.5
1	2	3	2	-49.4	-123.9	-114.8	0.2
1	2	3	3	-31.8	-97.5	-89.2	1.2
1	3	1	1	10.7	17.2	16.7	32.9
1	3	1	2	25.5	47.4	45.1	4.9
1	3	1	3	25.5	40.4	39.0	31.3
1	3	2	1	-25.9	-57.7	-53.7	6.5
1	3	2	2	14.0	24.0	23.1	0.5
1	3	2	3	14.0	24.0	23.1	3.0
1	3	3	1	-25.9	-57.7	-53.7	2.5
1	3	3	2	-69.2	-146.3	-137.0	0.1
1	3	3	3	-49.3	-119.3	-110.7	0.7
2	1	1	1	33.9	25.4	27.0	32.2
2	1	1	2	52.2	74.5	72.4	9.3
2	1	1	3	53.2	69.7	68.6	59.8
2	1	2	1	6.8	-46.1	-39.1	6.4
2	1	2	2	45.3	55.1	54.5	0.9
2	1	2	3	45.3	55.1	54.5	5.7
2	1	3	1	6.8	-46.1	-39.1	2.5
2	1	3	2	-7.8	-84.5	-75.4	0.2
2	1	3	3	6.9	-61.2	-51.8	1.3
2	2	1	1	31.2	26.6	27.7	47.4
2	2	1	2	48 0	68.9	66.9	12.1
2	2	1	3	48.9	64.0	62.6	78.4
2	2	2	1	3.0	-44.3	-38.2	9.4
2	2	2	2	40.1	48.4	47.8	1.2
2	2	2	3	40.1	48.4	47.8	7.4
2	2	3	1	3.0	-44.3	-38.2	3.6
2	2	3	2	-18.1	-97.2	-87.1	0.3
2	2	3	3	-1.9	-72.2	-63.7	1.8
2	3	1	1	41.5	46.0	45.9	30.3
2	3	1	2	51.1	71.4	69.5	4.5
2	3	1	3	52.3	66.6	65.6	28.9

Table B-1 (continued)

J	K	M	L	Inflation zero	Inflation 10%	Inflation 8.86%	Capital Stock weight %
2	3	2	1	17.5	-17.1	-12.5	6.0
2	3	2	2	43.8	51.4	50.9	0.4
2	3	2	3	43.8	51.4	50.9	2.7
2	3	3	1	17.5	-17.1	-12.5	2.3
2	3	3	2	-11.0	-91.5	-81.4	0.1
2	3	3	3	5.0	-67.2	-57.5	0.6
3	1	1	1	29.1	43.2	39.9	27.1
3	1	1	2	49.0	87.3	81.7	7.9
3	1	1	3	49.8	84.1	79.0	50.5
3	1	2	1	0.0	-20.9	-20.9	5.4
3	1	2	2	41.1	69.9	65.2	0.7
3	1	2	3	41.1	69.9	65.2	4.8
3	1	3	1	0.0	-20.9	-20.9	2.1
3	1	3	2	-15.7	-55.6	-53.8	0.2
3	1	3	3	0.2	-32.1	-30.8	1.1
3	2	1	1	29.1	45.0	41.7	7.0
3	2	1	2	46.4	82.8	77.6	1.8
3	2	1	3	47.1	79.3	74.5	11.6
3	2	2	1	0.0	-18.4	-18.4	1.4
3	2	2	2	38.0	64.7	60.3	0.2
3	2	2	3	38.0	64.7	60.3	1.1
3	2	3	1	0.0	-18.4	-18.4	0.5
3	2	3	2	-21.7	-65.8	-63.3	0.0
3	2	3	3	-5.3	-41.8	-39.9	0.3
3	3	1	1	29.0	48.3	45.0	42.8
3	3	1	2	40.8	73.3	68.7	6.3
3	3	1	3	41.3	68.9	64.9	40.8
3	3	2	1	-0.0	-13.9	-13.9	8.5
3	3	2	2	31.6	53.7	50.0	0.6
3	3	2	3	31.6	53.7	50.0	3.9
3	3	3	1	-0.0	-13.9	-13.9	3.3
3	3	3	2	-34.4	-87.4	-83.4	0.1
3	3	3	3	-17.0	-62.4	-59.1	0.9

J : Asset: 1. Machinery
2. Buildings
3. Inventories

K : Industry: 1. Manufacturing
2. Other Industry
3. Commerce

L : Finance: 1. Debt
2. New Share Issues
3. Retained Earnings

M : Ownership: 1. Households
2. Tax-exempt Institutions
3. Insurance Companies

APPENDIX C

THE STRUCTURE, SOURCE OF FINANCE, AND OWNERSHIP OF THE CAPITAL STOCK

Data Limitations

This chapter describes the data used in computing effective marginal tax rates on capital income in each industry for a given combination of assets, source of finance, and category of owner. For each aggregate industry we derive 27 different tax rates which for 3 aggregate industries means that in all we have 81 tax rates. While the distribution of these 81 tax rates is of some interest, most of our attention is focussed on the weighted average of the 27 marginal rates derived for each aggregate industry, asset, source of finance, and ownership.

In the next section, we describe how the capital stock weights are constructed and tabulated for each aggregate industry by asset. Unfortunately, while a classification of capital stock by asset and industry is readily available, it is not possible to allocate these across sources of finance and categories of owner. The data on sources of finance refer to the entire nonfinancial corporate sector. Although there is probably a link between the asset and financial structures of firms, we were unable to impute a particular source of finance to an investment in a particular type of asset. Nor were we able to obtain a classification of

ownership by industry or asset. It was, however, possible to produce a cross-tabulation by category of owner and source of finance similar to that found in K&F [1984].

Capital Stock Weights

Capital stock data for the industries were obtained from Statistics Canada publications Fixed Capital Flows and Stocks (13-211), Inventories, Shipments, and Orders in Manufacturing Industries (31-001) and G.P. Jenkins' SOCRAT data base. The first source provided information on buildings and machinery for all industries together with their service lives, while the other sources provided data on inventories.

Statistics Canada makes estimates of buildings and machinery stocks by industry using the perpetual inventory method. Depreciation is assumed to occur on a straight line basis. Capital stock data is provided at a more disaggregated level than that required for our purposes. Capital stock is broken down into building construction, engineering construction, machinery and equipment, capital items charged to operating expenses (primarily tools), and inventories. For a few industries information is also available for vehicles. Building construction and engineering construction were aggregated to form the buildings category in our model. Machinery and equipment, capital items charged to operating expenses, and vehicles (where appropriate) were aggregated to give the machinery category. The 1980 mid-year net stock in current

dollar figures were used. The data for inventories, adjusted for seasonal variation, were taken from the 1980 mid-year figures in current dollar terms. Our capital stock weights are summarized in Table C-1.

Sources of Financial Capital

For the purpose of this study it is necessary to calculate the sources of financial capital for each of the three aggregate industries under investigation. Following King and Fullerton [1984], p. 13, we regard the three sources of finance as

1) debt
2) new share issues
3) retained earnings.

We obtained the split between debt and equity from the SOCRAT data base of G.P. Jenkins [1984] (see Annex C-1). We calculated the average proportion of debt over the 1973-1981 period, and obtained the proportions for debt and new share issues plus retained earnings, respectively (Table C-2). Column 1 of this Table gives the long-term proportion of debt, adjusted for the present value of deferred taxes. The present value of the tax deferral itself can be regarded as part of the equity of the enterprise.

The long-term proportion of equity finance (Column 2 of Table C-2) has to be further sub-divided into financing by new

shares and by retained earnings. For this purpose, we utilized the Statistics Canada publication Financial Flow Accounts (Cat. No. 13-002, Table 4-2, Sectors and Subsectors Financial Flows). Table C-3 contains Net Increase in Stocks (Category 3520) and Gross Savings - i.e., retained earnings (Category 1100) of Section III, Non-financial Private Corporations. This Table indicates that on the average 13.44 per cent of equity financing was done by new share issues and 86.56 per cent by retained earnings. Applying these proportions to the last column of Table C-2, we obtained the composition of financing contained in Table C-4. This method assumes that the split between equity financing by new share issues and retained earnings is the same for each industry as the corresponding split for total non-financial private corporations. In all likelihood our assumption, forced upon us by the lack of more detailed information, tends to understate the magnitude of variability between industries.

It must be pointed out that our calculations of the split between debt and equity financing were based on book values adjusted for deferred taxes, economic depreciation and price changes of fixed capital stock. The studies in K&F [1984] (pp. 63-66, 114-129, 176-179, 236-239) used, whenever possible, the market values of debt and equity, using estimates of Tobin's "q". No information is available in Canada for "q" disaggregated by industry, and the wide dispersion of industry-specific "q"s around the total non-financial corporate "q" in the United States

(Furstenberg, 1980, p. 404) dissuaded us from attempting to calculate market data by applying the overall "q" to individual industries. We judge that adjusted book data are adequate for our purpose. In Table C-4b we compare the Canadian sources of capital with those of the four countries discussed in K&F [1984], (pp. 60, 129, 180, 239). Our results indicate that Canadian business finances somewhat more investment with new shares than does business in the other four countries. This result would be also true if we had used market values of equity rather than adjusted book values.

The Ownership of Equity

In this section we attempt to establish the ownership of equity by three categories, each of which is treated differently under the tax laws. The categories used in this study are

a) Households
b) Tax-exempt institutions
c) Insurance companies.

The basic source of our calculations is Statistics Canada Financial Flow Accounts, Cat. No. 13-002, Table 5.1: Sectors and Sub-sectors, Year-End Outstandings. Table C-5 indicates that in 1980 the equity liabilities of Canadian corporations amounted to $366,626 million. Table C-6 indicates the holders of these equities. We have assumed that the equity of the industries

discussed in this study are distributed over holders in the same proportion as the equity of all Canadian corporations.

In our analysis, following K&F [1984] (pp. 239-240), we omitted the equity held by Non-financial Private Corporations (Sector III), Non-financial Government Enterprises (Sector IV), The Monetary Authorities (Sector V), Investment Dealers (Sector VIII.1), Other Private Financial Institutions n.e.i. (Sector VIII.7), Public Financial Institutions (Sector IX), Federal Government (Sector X), Other Levels of Government (Sector XI), Social Security Funds (Sector XII), and the Rest of the World (Sector XIII). These are designated in Table C-6 with a letter O.

As a starting point, we assumed that Households ultimately owned the equities held by the following sectors designated in Table C-6 with an H:

Persons and Unincorporated Business
Chartered Bank
Quebec Savings Banks
Credit Unions and Caisses Populaires
Trust Companies
Mortgage Loan Companies
Mutual Funds

give us no information on registered savings plans, which are also tax-exempt. We have attempted a partial correction for registered savings plans and for Pension Plans administered by Life Insurers in the following manner.

Statistics Canada Cat. No. 61-006, Financial Institutions reports deposits with various financial institutions for registered savings plan purposes. Table C-8, Column 1, summarizes these amounts in the fourth quarter of 1980. Note that these figures do not include self-directed RRSPs and therefore they understate the amount held in this tax-exempt form. No information is available on self-directed RRSPs.

Table C-8, Column 2 indicates the proportion of financial assets which is held in equity form by the financial institutions in question. Assuming that the registered savings plan deposits are invested in the same proportion between equity and debt as are the total financial assets of the financial institutions, we can calculate the Registered Savings Plans (RSPs) held in equity form (Table C-8, Column 3). The same method was applied to Pension Plans administered by Life Insurers in Table C-9. Applying these results to the unadjusted equity ownership figures of Table C-7, Column 1, we obtained Pension Plans administered by Life Insurers and for equity ownership adjusted for RSPs in Column 3 of the same table. It should be re-emphasized that even the "adjusted" column understates the proportion of equity held in tax-exempt form for the following reasons:

Mortgage Investment Trust Companies
Sales Finance and Consumer Loan Companies

Similarly, as a first estimate, we assumed that Tax Exempt Institutions owned the equities held by the sectors designated with T.E., namely

Segregated Funds of Life Insurance Companies, and
Trusteed Pension Plans,

and Insurance Companies comprised the sectors designated with I, viz.

Life Insurance Business
Fire and Casualty Insurance Companies
Accident/Sickness Branches of Life Insurance Co.

This would yield the distribution of equity quoted in parentheses in Column 1 of Table C-7. This distribution has several shortcomings. In contrast with the K&F [1984] study, it does not represent beneficial ownership, because of lack of information on this subject in Canada. Also, Sectors I and II (Persons and Unincorporated Business) which we have classified as Households, include Charitable Institutions, which are tax-exempt. Unfortunately, there is no information on equity holdings of charitable institutions. The Financial Flow Accounts include Employer Sponsored Pension Plans administered by Life Insurers under Life Insurance Business. Furthermore, the Financial Flows

a) charitable institutions are included in Sectors I and II, even though these institutions are tax-exempt;
b) we use ownership figures, in absence of information on beneficial ownership;
c) our correction for RSPs does not include self-directed RRSPs;
d) Other n.e.i. consists mostly of holding companies, which may hold equity for the benefit of charitable institutions.

In our subsequent work we assume that equity ownership of each industry is distributed in the same proportions as is the ownership of total equity.

The international comparison of equity ownership is shown in Table C-10. This table indicates that Canada has relatively much more equity in the hands of Households and much less in Tax-exempt institutions and Insurance companies. This finding may be partially due to our data shortcomings discussed above. K&F [1984] assume for the United States, on the basis of a Securities and Exchange Commission study, that seven per cent of household equity (5.2 per cent of total equity) is held by non-profit institutions (p. 239). Similarly, in Sweden, 19.0 per cent of total equity is held by tax-exempt charities and foundations (p. 130). There is, however, also strong indication that Canadian regulations and/or investment policies of insurance

companies and pension funds are more conservative and less equity-oriented than those of the U.S.A. and U.K. (Table C-11).

The Ownership of Debt

We calculated the ownership of net debt using the Statistics Canada Financial Flow Accounts. In order to calculate net debt, we first obtained financial debt assets and liabilities; the difference constituting net financial debt. Following K&F [1984] (p. 24) we defined the relevant financial assets of non-financial private corporations as

Currency and Bank Deposits
Deposits in Other Institutions
Consumer Credit Receivables
Loans
Finance and Other Short Term Paper
Mortgages
Other (i.e., Non-Government) Bonds
Other Financial Assets

We excluded from Financial Assets

Foreign Currency and Deposits
Trade Receivables
Government Treasury Bills and Bonds

Claims on Associated Enterprises

Stocks

Foreign Investments

Similarly we defined the relevant financial liabilities as

Bank Loans

Other Loans

Mortgages

Other (i.e., Non-Government) Bonds

Other Liabilities

We excluded from Financial Liabilities

Trade Payables

Claims on Associated Enterprises

Stocks

Foreign Investments

The relevant dollar amounts are summarized in Table C-12.

Whose liabilities are the assets owned by the non-financial corporations, and who are the owners of the liabilities? Here again, we relied on the K&F [1984] approach (p. 241). "If all these amounts were listed vertically with assets included negatively, the column would sum to net corporate (non-government, non-foreign) indebtedness.... Then for each item in this column

we construct a row that determines its distribution among creditors or debtors." The Canadian Flow of Funds Table 4-12 has a column for each ownership category for, say, Mortgages. We assumed that the Mortgage Liabilities of Non-Financial Corporations were distributed among the ownership categories in the same proportion as were all mortgages.

This method of distribution was applied to the following assets

Loans
Finance and Other Short Term Paper
Mortgages
Other Canadian Bonds
Other Financial Assets

and to the following liabilities

Other Loans
Finance and Other Short Term Paper
Mortgages
Other Canadian Bonds
Other Liabilities

Currency and Bank Deposits were treated as liabilities of Banks, Deposits in Other Institutions as liabilities of Near-Banks, Consumer Credit Receivables as liabilities of Persons and

Unincorporated Business. Bank Loans were treated as assets of Banks.

Subtracting assets from liabilities in each column we obtained a first estimate of the distribution of net non-financial corporate indebtedness among owners (Table C-13, Column 1). As in the preceding section, we have designated ownership by Households with an H, by Tax Exempt Institutions with T.E., by Insurance Companies with I, and by all Others with O.

This would yield the distribution of debt ownership quoted in parentheses in Column 1 of Table C-14. These results are subject to the same criticism as those in the corresponding table and column of the preceding section. In particular, they do not take into account debt instruments held in Pension Plans administered by Life Insurers and in Registered Savings Plans. We attempted to adjust our results for this in the following manner. Table C-15, Column 1 contains the Registered Savings Plan Deposits with selected financial institutions. In Column 2, we quote the proportion of their assets which these institutions keep in private non-financial corporate debt instruments. The same method was used in Table C-16 to estimate the nonfinancial corporate debt held by Employer Sponsored Pension plans administered by Life Insurers. Applying the amounts of Table C-15 and C-16, Column 3 to the unadjusted debt ownership figures of Table C-14, we obtained the debt ownership adjusted for RSPs in Table C-14,

Column 3. We shall assume that the net corporate debt of each industry is distributed among owners in the same proportion as is total net non-financial corporate debt. As in the case of equity, the debt ownership distribution does not allow for debt held by

a) Charitable Institutions

b) Beneficial Ownership

c) Self-directed RRSPs

d) Holding Companies for Charitable Institutions.

This may be a partial explanation why Canada's households hold relatively more private non-financial corporate debt than the countries discussed in K&F [1984] (Table C-17).

Table C-1

Corporate Capital Stock Weights for Canadian Aggregate Industries, 1980

Industry	Machinery	Buildings	Inventories
Manufacturing	0.2208	0.1183	0.0998
Other Industry	0.1101	0.1615	0.0239
Commerce	0.0824	0.0759	0.1073

Source: Statistics Canada and G.P. Jenkins' SOCRAT data base.

Table C-2

Financial Structure of Aggregate Industries (1973-81 Average)

Industry	Debt	New Shares Plus Retained Earnings
Manufacturing	0.3473	0.6527
Other Industry	0.3740	0.6260
Commerce	0.5091	0.4909

Source: G.P. Jenkins' SOCRAT data base.

Table C-3

Net Increase in Stocks and Gross Saving, Non-Financial Private Corporations, 1973-1981

	(million dollars) (proportions in parentheses)	
	Net Increase in Stocks	Gross Saving
1973	1,118	10,731
	(.0944)	(.9056)
1974	828	12,119
	(.0640)	(.9360)
1975	1,161	13,207
	(.0808)	(.9192)
1976	927	16,882
	(.0521)	(.9479)
1977	2,672	16,521
	(.1392	(.8608)
1978	4,782	18,034
	(.2096)	(.7904)
1979	5,260	23,035
	(.1859)	(.8141)
1980	5,563	27,906
	(.1662)	(.8338)
1981	6,643	23,886
	(.2176)	(.7824)
Average (1973-1981)	(.1344)	(.8656)

Source: Statistics Canada, Cat. No. 13-002, Financial Flow Accounts Table 4-2.

Table C-4a

Source of Finance by Aggregate Industry, 1973-1981, Proportions

Industry	Debt	New Shares	Retained Earnings	Total
Manufacturing	.3473	.0877	.5650	1.0000
Other Industry	.3740	.0811	.5419	1.0000
Commerce	.5091	.0660	.4249	1.0000

Source: Tables C-2 and C-3.

Table C-4b

Sources of Financial Capital, Five Countries (proportions)

	Canada	United Kingdom	Sweden	Germany	United States
			Manufacturing		
Debt	.347	.193	.405	.435	.198
New Shares	.088	.044	.024	.049	.059
Retained Earnings	.565	.763	.571	.516	.743
	1.000	1.000	1.000	1.000	1.000
			Other Industry		
Debt	.374	.193	.812	.312	.485
New Shares	.084	.044	.009	.060	.038
Retained Earnings	.542	.763	.179	.628	.477
	1.000	1.000	1.000	1.000	1.000
			Commerce		
Debt	.509	.193	.625	.496	.400
New Shares	.066	.044	.018	.044	.044
Retained Earnings	.425	.763	.357	.461	.556
	1.000	1.000	1.000	1.000	1.000

Source: Canada: Table C-4a
Others: King and Fullerton, p. 66, 129, 180, 239.

Table C-5

Equity Liabilities, Canadian Corporations, 1980

	(million dollars)
Claim on Associated Enterprises	111,971
Stocks	254,655
	366,626

Source: Statistics Canada, Financial Flow Accounts, Cat. No. 13-002, Table 5-1 and unpublished data on Corporate Claims on Associated Enterprises.

Table C-6

Holders of Equities, Canadian Corporations, 1980

Sector			(million dollars)
I & II	Persons and Unincorporated Business	(H)	115,995
III	Non-financial Private Corporations	(O)	65,497
IV	Non-financial Government Enterprises	(O)	618
V	The Monetary Authorities	(O)	...
VI.1	Chartered Banks	(H)	24,021
VI.2.1	Quebec Savings Banks	(H)	...
VI.2.2	Credit Unions and Caisses Populaires	(H)	782
VI.2.3	Trust Companies	(H)	1,977
VI.2.4	Mortgage Loan Companies	(H)	1,135
VII.1	Life Insurance Business	(I)	2,532
VII.2	Segregated Funds of Life Insurance Cos.	(T.E.)	2,176
VII.3	Trusteed Pension Plans	(T.E.)	9,077
VIII.1	Investment Dealers	(O)	111
VIII.2	Mutual Funds	(H)	1,167
VIII.3	Fire and Casualty Insurance Companies	(I)	1,658
VIII.4	Mortgage Investment Trust Companies	(H)	837
VIII.5	Sales Finance & Consumer Loan Co.	(H)	543
VIII.6	Accident/Sickness Branches of Life Insurance Companies	(I)	120
VIII.7	Other n.e.i.	(O)	52,834
IX	Public Financial Institutions	(O)	1,329
X	Federal Government	(O)	55
XI	Other Levels of Gov't & Hospitals	(O)	237
XII	Social Security Funds	(O)	...
XIII	Rest of the World	(O)	83,925
Total			366,626

Source: Statistics Canada, Financial Flow Accounts, Cat. No. 13-002, and unpublished detail on Corporate Claims on Associated Enterprises.

H = Households
T.E. = Tax Exempt
I = Insurance
O = Other

Table C-7

Ownership of Equity in Canadian Corporations, 1980

	(million dollars) (proportion in parentheses) Unadjusted	Adjustment for RSPs and Life Insurers	Adjusted
1) Households	146,457	-1,426	145,031
	(0.904)		(0.895)
Persons and Unincorp. Business	115,995		
Chartered Banks	24,021	-402	
Quebec Savings Banks	...		
Credit Unions, etc.	782	-62	
Trust Companies	1,977	-402	
Mortgage Loan Companies	1,135		
Mutual Funds	1,167	-560	
Mortgage Investment Trust Cos.	837		
Sales Finance, etc.	543		
2) Tax Exempt Institutions	11,253	+2,497	13,750
	(0.069)		(0.085)
Segregated Funds	2,176		
Trusteed Pension Plans	9,077		
Registered Saving Plans and Life Insurance Business	N/A	+2,497	
3) Insurance Companies	4,310	-1,071	3,239
	(0.027)		(0.020)
Life Insurance Business	2,532	-1,071	
Fire & Casualty Insurance	1,658		
Accident & Sickness Insurance	120		
Total	162,020		162,020
	(1.000)		(1.000)
4) Other	204,606		
Non-financial Private Corps.	65,497		
Non-financial Gov't Ent.	618		
The Monetary Authorities	...		
Investment Dealers	111		
Other n.e.i.	52,834		
Public Financial Institutions	1,329		
Federal Government	55		
Other Levels of Govt. & Hosp.	237		
Social Security Funds	...		
Rest of the World	83,925		
Grand Total	366,626		

N/A = Not applicable

Table C-8

RRSP and Other Registered Savings Plan Deposits with Selected Financial Institutions, and Estimated Equity Share, 4th Quarter 1980

	Registered Savings Plan Deposits Million $	Equity as Proportion of Total Financial Assets	Estimated Equity of Registered Savings Plans Million $
	(1)	(2)	(1) $\times_{(3)}$ (2)
Mutual Funds	2,186	0.256	560
Trust and Mortgage Loan Companies	7,051	0.057	402
Chartered Banks	3,436	0.117	402
Credit Unions	2,491	0.025	62
Total	15,164		1,426

Sources: Column 1, Statistics Canada, Cat. No. 61-006, Financial Institutions, 1983 second quarter, p. 196.
Column 2, Statistics Canada, Cat. No. 13-002, Financial Flow Accounts.

Table C-9

Employer Sponsored Pension Plans Administered by Life Insurers, 4th Quarter 1980

	General Funds (Includes RRSPs) Million $	Equity as Proportion of Total Financial Assets	Estimated Equity in Pension Plans Administered by Life Insurers
			(1) (*3) (2)
Life Insurers (excluding Segregated Funds)	14,930	.072	1,071

Sources: As in Table C-8.

Table C-10

Ownership of Equity, 1980

	(proportions)				
	Canada	United Kingdom	Sweden	West Germany	United States
Households	.895	.435	.604	.731	.743
Tax-exempt institutions	.085	.407	.302	.207	.215
Insurance Cos.	.020	.157	.094	.062	.041

Source: Table C-7, King and Fullerton [1984] pp. 69, 130, 181, 240.

Table C-11

Financial Assets and Equity Held by Insurance Companies and Pension Funds, 1980

	Canada Billion Can.$	U.S.A. Billion U.S.$	U.K. Billion Pound Sterling
Total Financial Assets	92.2	1123.4	115.1
Equity	13.8[1]	299.8[2]	40.6[3]
Equity as proportion of total assets	.150	.267	.352

Notes: 1 Stocks and Claims on Associated Enterprises
2 Corporate Equities
3 Ordinary Shares of U.K. Companies

Sources: Column 1, Statistics Canada, Financial Flow Accounts, Cat. No. 13-002
Column 2, Board of Governors of the Federal Reserve System, Flow of Funds Accounts, Assets and Liabilities Outstanding 1959-1982, August 1983, p. 24
Column 3, Central Statistical Office, Financial Statistics, No. 271, September 1984, pp. 82-84.

Table C-12

Non-Financial Corporate Debt, 1980

	(million dollars)
Assets	44,565
Currency and Bank Deposits	18,190
Deposits in Other Institutions	817
Consumer Credit Receivables	1,084
Loans	2,738
Finance and Other Short Term Paper	2,945
Mortgages	4,143
Other Canadian Bonds	486
Other Financial Assets	14,162
Liabilities	160,623
Bank Loans	55,250
Other Loans	17,398
Finance and Other Short Term Paper	4,688
Mortgages	26,174
Other Canadian Bonds	28,689
Other Liabilities	28,424
Net Debt	116,058

Source: Statistics Canada, Cat. No. 13-002, Financial Flow Accounts Table 5-1.

Table C-13

Holders of Non-Financial Corporate Net Debt, 1980

Sector			(million dollars)
I & II	Persons and Unincorporated Business	(H)	8,205
III	Non-financial Private Corporations	(O)	1
IV	Non-financial Government Enterprises	(O)	656
V	The Monetary Authorities	(O)	88
VI.1	Chartered Banks	(H)	43,304
VI.2	Near Banks	(H)	12,692
VII.1	Life Insurance Business	(I)	7,763
VII.2	Segregated Funds of Life Insurance Cos.	(T.E.)	801
VII.3	Trusteed Pension Plans	(T.E.)	5,741
VIII.1	Investment Dealers	(O)	1,027
VIII.2	Mutual Funds	(H)	454
VIII.3	Fire and Casualty Insurance Companies	(I)	17
VIII.4	Mortgage Investment Trust Companies	(H)	205
VIII.5	Sales Finance & Consumer Loan Cos.	(H)	2,114
VIII.6	Accident/Sickness Branches of Life Insurance Companies	(I)	430
VIII.7	Other n.e.i.	(O)	3,165
IX	Public Financial Institutions	(O)	6,022
X	Federal Government	(O)	1,821
XI	Other Levels of Gov't & Hospitals	(O)	4,287
XII	Social Security Funds	(O)	45
XIII	Rest of the World	(O)	17,220
Total			116,058

Source: Statistics Canada, Financial Flow Accounts, Cat. No. 13-002, Table 5-1, and own calculations as described in text.

Table C-14

Ownership of Non-Financial Corporate Net Debt, 1980

(million dollars)
(proportion in parentheses)

	Unadjusted	Adjustment for RSPs and Life Insurers	Adjusted
1) Households	66,974	-2,853	64,121
	(.820)		(.784)
Persons and Unincorp. Business	8,205		
Chartered Banks	43,304	-1,036	
Near-Banks	12,692	-1,590	
Mutual Funds	454	-227	
Mortgage Investment Trust Cos.	205		
Sales Finance, etc.	2,114		
2) Tax Exempt Institutions	6,542	+6,194	12,736
	(.080)		(.156)
Segregated Funds	801		
Trusteed Pension Plans	5,741		
Registered Savings Plans and Life Insurance Business	N/A	+6,194	
3) Insurance Companies	8,210	-3,341	4,869
	(.100)		(.060)
Life Insurance Business	7,763	-3,341	
Fire & Casualty Insurance	17		
Accident & Sickness Insurance	430		
Total	81,726		81,726
	(1.000)		(1.000)
4) Other	34,332		
Non-financial Private Corps.	1		
Non-financial Gov't Ent.	656		
The Monetary Authorities	88		
Investment Dealers	1,027		
Other n.e.i.	3,165		
Public Financial Institutions	6,022		
Federal Government	1,821		
Other Levels of Govt. & Hosp.	4,287		
Social Security Funds	45		
Rest of the World	17,220		
Grand Total	116,058		

N/A = Not applicable

Table C-15

RRSP and Other Registered Savings Plan Deposits with Selected Financial Institutions, and Estimated Private Non-Financial Corporate Debt Instrument Share, 4th Quarter 1980

	Registered Savings Plan Deposits Million $	Private Non-Financial Corporate Debt as Proportion of Total Financial Assets	Estimated Private Non-Financial Corporate Debt Million $
	(1)	(2)	(1) $\times$ (2)
Mutual Funds	2,186	.1040	227.3
Near-Banks	9,542	.1666	1,589.7
Chartered Banks	3,436	.3015	1,036.0
Total	15,164		2,853.0

Sources: Column 1, Statistics Canada, Cat. No. 61-006, Financial Institutions, 1983 second quarter, p. 196.

Columns 2 & 3, calculated from Statistics Canada, Cat. No. 13-002, Financial Flow Accounts.

Table C-16

Employer-Sponsored Pension Plans Administered by Life Insurers, 4th Quarter 1980

	General Funds (Includes RRSPs) Million $	Private Non-Financial Corporate Debt as Proportion of Total Financial Assets	Estimated Private Non-Financial Corporate Debt Million $
	(1)	(2)	(1)(3)(2)
Life Insurers (excluding Segregated Funds)	14,930	.2238	3,341.3

Sources: As in Table C-15.

Table C-17

Ownership of Debt, 1980

	(proportions)				
	Canada	United Kingdom	Sweden	West Germany	United States
Households	.784	.718	.604	.543	.609
Tax Exempt Inst.	.156	.137	.302	.336	.237
Insurance Cos.	.060	.145	.094	.121	.153

Sources: Column 1, Table C-14, Column 3.

Columns 2-5, King and Fullerton [1984], pp. 73, 130, 184, 242.

ANNEX C-1

Sequence Reference #V156 of the SOCRAT data base contains the variable "Ratio of Debt to Debt Plus Equity". This is defined as

V156 = (V37 - V22 - V24 - (1 - V87) * V35) / (V108 + V90), where
V37 = Total liabilities
V22 = Accounts payable
V24 = Advances and prepayments (liability)
V87 = F-factor (present value of $1 deferred income tax)
V35 = Reserve for future income tax
V108 = Net productive assets adjusted for depreciation, inflation
V90 = Financial assets
V108 = V89 + V105 + V99 + V12 * (V74/V78)
V89 = Working capital (original $)
V105 = Land adjusted for inflation
V99 = Net capital stock, corporate, corrected for depreciation, inflation
V12 = Net depletable assets
V74 = Net capital stock - industry (current prices)
V78 = Net capital stock - industry (original prices)
V89 = V1 + V4 + V3 - V22 + V5 + V7 + V9 - V24

V1 = Cash
V4 = Inventories
V3 = Accounts receivable
V22 = Accounts payable
V5 = Prepaid expenses
V7 = Deposits and advances
V9 = Other current assets
V24 = Advances and prepayments (liabilities)

V105 = V10 * V75/V72

V10 = Land
V75 = Gross capital stock - industry (current prices)
V72 = Gross industrial capital stock (original prices)
V99 = V74* (V71/V72)

V74 = Net capital stock - industry (current prices)
V71 = Gross corporate capital stock (original prices)
V72 = Gross industry capital stock (original prices)

V90 = V2 + V6 + V8 + V13 + V14 + V15 + V16 + V17 + V18 + V19

V2 = Marketable securities
V6 = Due from affiliates
V8 = Loans receivable
V13 = Mortgages
V14 = Loans and notes receivable
V15 = Long-term investments
V16 = Investment in affiliates
V17 = Advances to affiliates
V18 = Deferred charges
V19 = Other assets

APPENDIX D

THE CALCULATION OF THE WELFARE LOSS DUE TO THE DISPERSION IN EFFECTIVE TAX RATES

In calculating the welfare loss caused by the dispersion of the marginal effective tax rates we followed Harberger [1966] and Rosenberg [1969].

We obtained corporation profits before taxes from Statistics Canada, National Income and Expenditure Accounts, Cat. No. 13-201, Table 34 (Table D-1).

Appendix C Table C-3 indicates that net increase in stocks accounted for 13.44 per cent of equity financing, and retained earnings for 86.56 per cent in the 1973-81 period. Applying these data to the corporation profits before taxes of Table D-1 we can calculate the income flowing to new share issues and to retained earnings (Table D-2).

We assumed that in each aggregate industry the ratio of interest paid to corporate profits is the same as the ratio of debt to equity (Appendix C, Table C-2). The calculation of interest is contained in Table D-3.

The interest, dividend and capital gain figures by aggregate industry were then assigned to the 9 components (three industries by three assets) on the basis of their respective capital stock

weights. A further adjustment was necessary for those components which referred to the asset "buildings." The pre-tax income concept used in this study means prior to property tax as well as to corporate and personal income tax. The Statistics Canada concept of corporate profits before tax is prior to income tax, but after property tax. Therefore we had to adjust upward the pre-tax incomes of the "buildings" components by the property tax (calculated from Table 2-4). The total property tax was apportioned to the 3 components of "buildings" in proportion to the size of the capital stock and added to the income before taxes.

Having calculated the 9 components and the Overall tax rate for the "fixed-r" case with r equal to 5 per cent, and assuming that nominal interest rates increase point for point with inflation we obtained the after-tax income and the tax rate as percentages of the after-tax income. We can now calculate the welfare loss, when the loss is defined (Harberger, 1966) as

$$L = 0.5^* \sum_{i=1}^{9} W_i(t_i-\bar{t})^2 \qquad \text{(D-1)}$$

where

L = welfare loss
W_i = after-tax income of component i
t_i = tax as proportion of after-tax income of component i
$\bar{t}$ = overall tax as proportion of overall after-tax income

The contributions of the 9 components to the total welfare loss are listed in Table D-4.

Table D-1

Corporation Profits before Taxes, Canada, 1980

	(Million Dollars)	
Manufacturing		13,859
Other Industry		
Construction	921	
Transportation	1,170	
Storage	145	
Communication	1,182	
Electric Power, etc.	455	
		3,873
Commerce		
Wholesale Trade	2,968	
Retail Trade	2,018	
Community etc. Services	2,066	
		7,052
Overall		24,784

Source: Statistics Canada: National Income and Expenditure Accounts, Cat. No. 13-201, Table 34.

Table D-2

Distribution of Corporate Profits before Taxes, Canada, 1980

		(Million Dollars)
Manufacturing		
New share issues:	.1344 * $13,859	1,862.6
Retained earnings:	.8656 * $13,859	11,996.4
Other Industry		
New share issues:	.1344 * $3,873	520.5
Retained earnings:	.8656 * $3,873	3,352.5
Commerce		
New share issues:	.1344 * $7,052	947.8
Retained earnings:	.8656 * $7,052	6,104.2

Source: Tables C-3 and D-1.

Table D-3

Debt, Equity, Interest and Corporation Profits before Taxes, Canada, 1980

Manufacturing			
Debt	.3473	Interest	$ 7,374.3 million
Equity	.6527	Corp. profit	$13,859 million
Other Industry			
Debt	.3740	Interest	$ 2,313.9 million
Equity	.6260	Corp. profit	$ 3,873 million
Commerce			
Debt	.5091	Interest	$ 7,313.5 million
Equity	.4909	Corp. profit	$ 7,052 million

Source: Tables C-2 and D-1.

Table D-4

Welfare Loss, By 9 Components, 1980 Capital Structure, Fixed-r Case,

(Million Dollars)

	1984 tax rates	1985 tax rates	1985 tax rates & policy package
Manufacturing			
Machinery	3,675.5	4,476.3	1,271.5
Buildings	903.5	903.8	544.6
Inventory	2.7	4.6	140.6
Other			
Machinery	7.5	9.9	96.9
Buildings	240.8	235.0	33.8
Inventory	0.2	1.7	4.0
Commerce			
Machinery	321.3	248.0	287.1
Buildings	640.0	800.5	489.4
Inventory	97.1	74.7	6.5
Overall	5,888.6	6,754.5	2,874.4

Note: Figures may not add to total because of rounding.
3.67% inflation rate assumed.

Notes

1 On the tax form the actual credit allowed is 22.67 per cent of grossed-up dividends which in fact is a federal credit of 34 per cent of grossed-up dividends reduced to allow for the granting of a provincial counterpart credit.

2 If the tax rate on pension income (m_2) is indeed less than that on earnings prior to retirement (m_1) and savings are held by pension funds for N years, the rate of return on such funds is

$$\left(\frac{(1+i)\ (1-m_2)}{(1-m_1)}\right)^N - 1.$$

Clearly, if $m_1=m_2$, no taxes are paid on interest income, whereas if $m_2<m_1$, a subsidy is involved.

3 Exempt life insurance policies constitute over 90 per cent of all policies sold.

4 If any personal taxes are paid on income received upon maturity or surrender of an exempt policy, our calculations will tend to underestimate effective marginal tax rates on investment income received by households indirectly via life insurance companies. Unfortunately, more precise estimates of these personal tax rates require information concerning life insurance business that is not readily available. Our calculations also ignore taxes on premiums which are levied by some provinces.

5 As in the case of households, we assumed that life insurance companies expect to realize 10 per cent of their capital gains in each year and then used equation (13) in D.J.M.S. [1985a] Appendix A to calculate the effective rate of tax accruing on capital gains z_I.

6 See Department of Finance (1985, p. 18).

7 We have decided to ignore the federal sales tax on manufactured products in our analysis. Note also that in 1980 Canada did not yet apply the half-year convention, but the U.S.A. did.

8 Don Fullerton, verbal communication.

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